Interim Report
Deliverable 3.2:
Focus Group Management Process
of the
Restricted Use Technology Study

September 30, 2005

Altarum Institute
3520 Green Court, Suite 300
Ann Arbor, MI 48105-1579

Report Prepared by:

Mr. Richard Wallace
richard.wallace@altarum.org
734-302-4775

Dr. Robert Shuchman
robert.shuchman@altarum.org
734-302-5610

Dr. Tim Doyle
tim.doyle@altarum.org
734-302-4779

Altarum Project Manager:

Mr. Greg Leonard
greg.leonard@altarum.org
734-302-4716

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The Altarum Institute, under contract to the Michigan Department of Transportation (MDOT), currently is engaged in a project called the "Altarum Restricted Use Technology Study." This study, an 18-month effort, seeks to apply restricted use technology to the mandates of MDOT. As one deliverable within Phase I of this study, the Altarum project team is required to provide a management plan for the focus group process that stands as a central component of Phase II of the study and to submit this plan for review and approval by MDOT staff. The Altarum team has completed this task, and this report (Deliverable 3.2) presents the needed elements for a focus group management plan, including:

- Final definition of the eight focus group topics
- Initial set of issues to be addressed by each of the focus groups
- Identification of representative data that will be used initially with each of the groups
- List of invitees for each of the eight groups, draft invitations for governmental and non-governmental invitees, and a sample consulting agreement for non-governmental invitees
- Description of the overall processes and approaches that will be used to manage and conduct each of the eight groups
- Tentative schedule for conducting the focus groups

Based on an initial list of eight focus group topics present in the Work Plan for the study, combined with interviews with 11 key MDOT informants and Rob Surber (Deputy Director) of the state's Center for Geographic Information (CGI), we confirmed that the initial list remains valid, with one modification. Specifically, the interviews revealed a growing commitment to highway and roadway operations within MDOT that was not clearly reflected in the eight original topics; thus, operations has been added to the ITS topic. The resulting list of eight focus group topics is:

1. Asset Management
2. Environmental Applications
3. ITS and Operations
4. Inter-modal and Multi-modal Applications
5. Traffic Congestion and Safety
6. HAZMAT Shipments
7. Border Crossings
8. Homeland Security

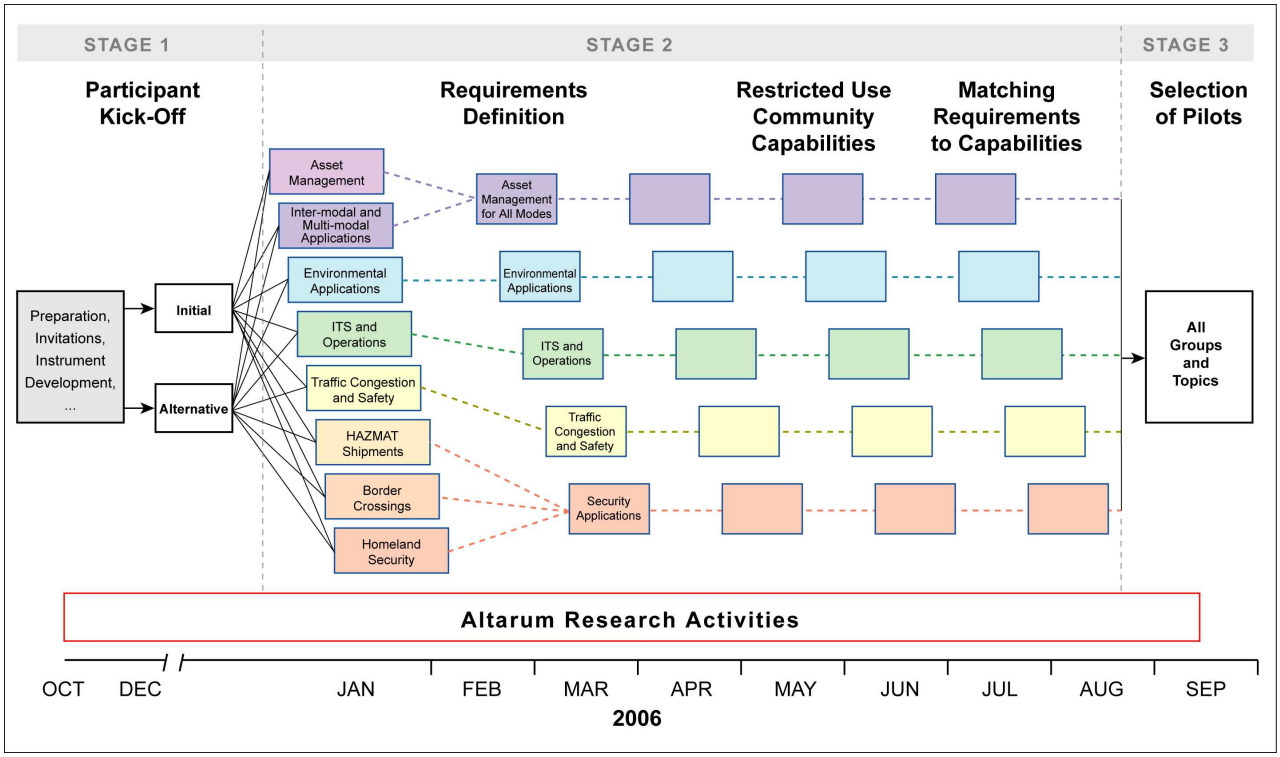
The interviews also provided detailed information on each of the eight topics that has allowed the Altarum team to plan the specific issues, data needs, applications, and representative data sets that will serve as the basis of the focus group meetings and allow the groups to work productively and effectively toward their goal of selecting the most promising applications for approximately three pilot studies that will take place in Phase III. The interviews also revealed the importance of high-resolution data and mapping for all eight topic areas. Thus, high resolution data will be an important input that adds value to all focus group meetings and of the pilot studies that come in Phase III. This will also require close cooperation between MDOT, Altarum, and CGI as the study progresses, and our initial meeting with Rob Surber of CGI also served to set this needed cooperation in motion.

With the eight broad topics, and the critical subtopics and issues within each of the eight, identified, the Altarum team successfully linked the list of focus group invitees developed in Deliverable 3.1 with the focus group topics, and these associations are provided in this report. In short, these lists show that some very important MDOT staff are needed in more than one of the groups, suggesting a need for running some of the group meetings in parallel or in close temporal proximity to lessen the demand on their time.

We also foresee both an expected and desirable potential for the eight groups to collapse into, perhaps, five groups as the focus group process progresses. We reached this conclusion based on the convergence of data needs and applications that arose from the informant interviews. Based on this apparent convergence, we see strong possibilities, for example, of the asset management and multi-modal groups merging into a single group focused on asset management across all modes.

With the topics and invitees settled on, we developed a tentative schedule for conducting the groups (see Figure 1) that runs from January 2006 through September 2006 (assuming an October 1, 2005 start date for Phase II of the study), along with our overall plan for managing and conducting the groups. Highlights of this plan include having (1) one participant (an MDOT employee) within each group serving as the peer leader of the group; (2) Altarum and its subcontractors serving the groups via technical support, facilitation, record-keeping, and other management and administrative tasks; and a logical progression from defining transportation system requirements to testing the capabilities of restricted use technology to meet these requirements to selection of pilot studies for Phase III.

Figure 1: Tentative Schedule of Focus Group Meetings



In our tentative schedule, the groups will meet at the beginning of the project for a participant kick-off meting consisting of an unclassified briefing on the capabilities of restricted use technology. Realistically, this may need to occur in two or three waves, starting in January 2006, to meet the scheduling constraints of all participants. Immediately after this initial briefing, each of the eight topical groups will meet on its own to begin development of transportation system requirements. Thereafter, the topical groups will meet about two more times each, followed by a final meeting of all groups (in September 2006) to reach a final selection of pilot studies.

When and where possible, we propose using MDOT facilities in Lansing (e.g., at MDOT headquarters, the Aeronautical Building, the Construction & Technology Building, and the Secondary Complex Training Facility) and the Altarum offices as the primary locations for meetings. This will reduce travel needs for most participants. When a larger space (such as for the first meeting) or a secure location are needed, Altarum will make the necessary arrangements to secure other facilities that meet the needs of the study and provide travel reimbursements for non-MDOT participants.

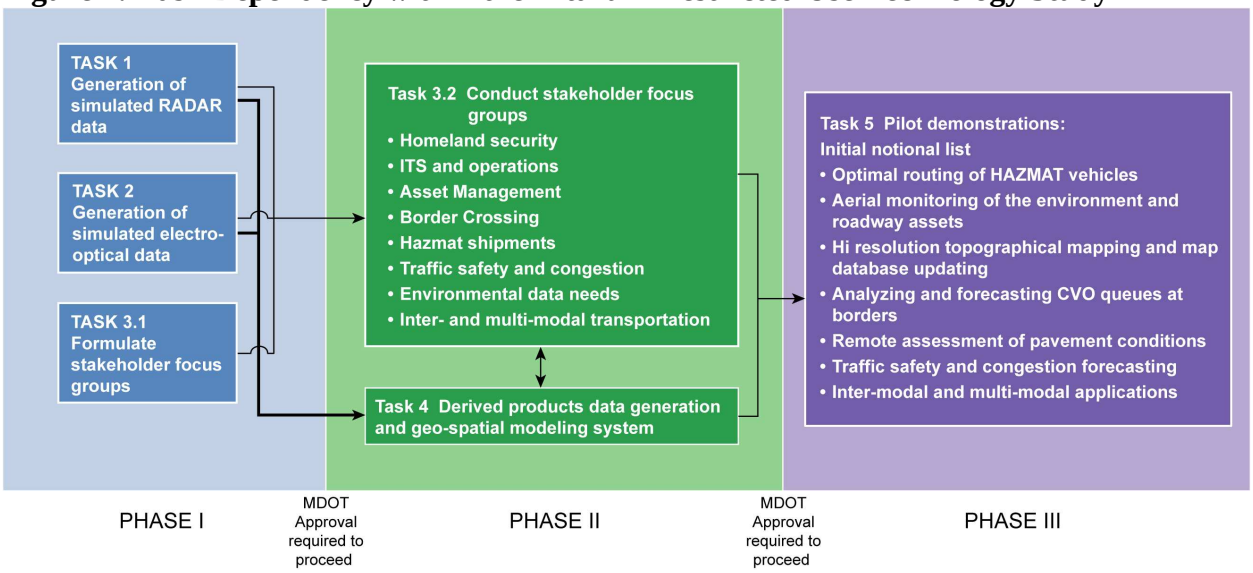
BACKGROUND

The primary goals of the Altarum Restricted Use Technology Study are to investigate the use of information derived from restricted-use technologies and data to support the mission and activities of the Michigan Department of Transportation (MDOT) and to estimate the potential usefulness of these technologies during one or more pilot studies. To scope the effort, Altarum researchers, MDOT personnel, and other transportation professionals (including Brent Bair of the Road Commission for Oakland County and Morrie Hoevel of the Federal Highway Administration) developed a list of eight potential application areas for restricted use technology within MDOT's operations. These potential application areas were then review and vetted with senior MDOT management (including Gloria Jeff, Kirk Steudle, Larry Tibbits, John Friend, William Tansil, and others). This process led to a resultant set of application areas that were incorporated into the project's work plan, which defines the project activities. These application areas are listed below.

1. Intelligent transportation systems (ITS)
2. Asset management
3. Homeland security
4. Border crossings: efficiency v. security
5. HAZMAT shipments
6. Traffic safety and congestion
7. Environmental data needs
8. Inter-modal and multi-modal transportation

According to the work plan, these application areas become the topics for a series of stakeholder focus groups that stand as the central, third task of the study, as shown in Figure 2. Prior to the actual administration of the focus groups, the Altarum team has developed a management plan for conducting the focus groups. This plan, which is associated with Task 3.1, i.e., the selection of the final application areas and organization of the focus group effort, is the focus of this report. This report constitutes the second deliverable under Task 3.1 and completes the work scheduled for Task 3 under Phase I of the study. This report builds on the first deliverable, a proposed list of focus group invitees submitted to MDOT on September 1, 2005 for review and approval. It presents and explains the methods used to select focus group topics, allocates proposed invitees to specific focus groups, describes a general protocol for conducting the focus groups, and identifies a tentative schedule for conducting the focus groups. Thus, this report defines the general parameters needed to establish and conduct the focus group activities in Phase II.

Figure 2: Task Dependency within the Altarum Restricted Use Technology Study



SELECTION OF FOCUS GROUP TOPICS

To refine and finalize the eight application areas that will serve as the topics of the focus groups, Altarum researchers conducted a series of discussions with key MDOT informants. These informants were identified by project principals from both Altarum and MDOT. The meetings with these informants added the details necessary to codify and elaborate on the content of each focus group topic, as well as on the boundaries between topics. They also verified and validated that the eight application areas listed above remain high priority topics for MDOT. In short, these discussions confirmed the continued relevance and importance of the eight topics and provided the data and other information necessary to develop specific sub-topics associated with each broad topical area.

Interviews to Confirm Focus Group Topics

To confirm the importance of the eight topics agreed to by Altarum and MDOT at the onset of the project, the Altarum team conducted interviews with MDOT staff identified as key informants in regards to each of the eight topics.[1] This process resulted in nine interviews with 12 informants, including one from the Center for Geographic Information within the state's Department of Information Technology. These informants and the key topics covered in each of the nine interviews are listed in chronological order in Table 1.

Table 1: List of MDOT Informants and Interview Topics

Interview Date	Interview Topic(s)	Informant(s)
August 17, 2005	ITS	Greg Krueger
August 18, 2005	Environmental applications, GIS	Paul McAllister, Mike O'Malley
August 18, 2005	Asset management, GIS	Bill Tansil, Ron Vibbert
August 23, 2005	Border crossings	Kris Wisniewski
August 26, 2005	HAZMAT and homeland security	Eileen Phifer
September 6, 2005	ITS	Jim Schultz
September 13, 2005	Inter-modal and multi-modal applications	Tim Hoeffner
September 16, 2005	GIS and high-resolution mapping	Rob Surber (of CGI)
September 19, 2005	Traffic safety and congestion	John Friend, Jim Culp

Upon completion of each interview, we prepared a summary of the discussion and shared these summaries among project staff for review and analysis. After we completed drafting the summaries internally, we provided copies of the draft summaries to the informants so that they could further check the summaries for accuracy. The summaries, in their final, edited, and fact-checked form, are provided in Appendix B. In addition to allowing us to finalize the list of eight focus group topics, these informant interviews identified potential focus group participants and important subtopics and other issues associated with each of the eight major topics. These subtopics also provided us with an understanding of what applications and outcomes appear to offer the most benefit MDOT within each of the eight topic areas. Thus, the interviews as a whole served as an important input to the focus group management plan and to the outcomes and processes detailed in the remainder of this report.

[1] See Appendix A for the protocol used in these interviews. Because the interviews were semi-structured, however, the resulting discussions were open-ended, with the protocols used primarily to ensure that all topics of interest were covered. For the most part, we used the discussions to learn about the issues of highest importance to MDOT staff.

Revision of Focus Group Topics

In addition to confirming the validity of the focus group topics, the discussions with MDOT informants revealed the critical importance of two other topics: (1) high-resolution data and mapping and (2) highway and roadway operations. We analyzed the value of adding these as focus group topics and determined that high-resolution data and mapping are best viewed as input data and tools, rather than as a separate application of restricted use technology. That is, high-resolution data and mapping are characteristics of the data encompassing its quality and precision; thus, they are not an application area per se. Therefore, we concluded that, though it clearly is an important topic, it should not be treated as a separate application area and rather is a data quality enhancement that benefits all potential application areas. With respect to the growing importance within MDOT of the operation of the transportation system, we determined that, with its emphasis on real-time identification and management of traffic problems and their solutions, operations is best combined with ITS, leading to a revised list of topics that is shown in Table 2, along with the original eight topics. Thus, Table 2 presents the original list of topics, as well as the slightly revised list of topics that adds operations to ITS. The revised list of topics will be used as the study moves forward.

Table 2: Original and Revised Focus Group Topics

Original Topics	Revised Topics
Asset Management	Asset Management
Environmental Applications	Environmental Applications
ITS	ITS and Operations
Inter-modal and Multi-modal Applications	Inter-modal and Multi-modal Applications
Traffic Safety and Congestion	Traffic Safety and Congestion
HAZMAT Shipments	HAZMAT Shipments
Border Crossings	Border Crossings
Homeland Security	Homeland Security

As the study progresses, the number of distinct topics could adjust as initial meetings of groups reveal similar and overlapping data needs and technical requirements. For example, the informant interviews revealed that the border crossings and homeland security (and possibly HAZMAT) topics have fairly similar needs; thus, they also appear likely to benefit from the same or similar applications of restricted information. Similarly, many of the inter-modal topics focus on attributes that can be characterized in terms of assets (e.g., railroad crossing markings, rail lines, etc.). Thus, the Altarum team will continually analyze the value of merging some of the focus group topics into a single group, though we will consult with MDOT before collapsing multiple topics into one area. Ultimately, the focus group process will develop valuable requirements statements for all eight topics, but we expect that only three or so pilot studies will be pursued. Thus, some convergence across topics is both expected and desirable.

Components of and Data Needs for Each Stakeholder Focus Group Topic

In addition to confirming the importance of our original topics areas for the stakeholder focus groups, the discussions with key MDOT informants also provided significant insights into the sub-topics that are most important to include within each of the focus groups. These sub-topics are important in that they provide the focus for specific applications of restricted use technology within the broad application areas. Furthermore, largely under the RADAR and electro-optical

tasks of this study, we identified potential data sets to be used as input to the focus groups. These data sets will show representative imagery, demonstrate possible applications, and generally serve as an input to the focus group discussions. The brief sections that follow describe roughly three to five specific sub-topics within each of the original eight topics,[2] and identify potential data that will be used to inform and spark discussion for the groups.[3] These data inputs are also summarized in Tables 3 and 4 for RADAR and electro-optical sources, respectively. For thoroughness, this elaboration is also provided for high-resolution mapping, in the event that it becomes a stand-alone topic.

Asset Management

Both Bill Tansil and Ron Vibbert of the MDOT's Asset Management Division served as informants on applications of restricted use technology to asset management. This discussion focused on using remotely sensed data to assess conditions of assets more cost-effectively than current approaches, better than current approaches, and/or in more locations throughout the state than current approaches. In short, this discussion revealed that the restricted use technology can help asset management by making the data in the asset management database more complete, higher quality, and/or timelier. Specific subtopics included:

- Remote sensing of pavement condition
- Extend the reach of MDOT's data collection effort (data from more places), such as collection of vehicle counts and origin-destination data, without additional cost
- Obtain higher quality data, easier to distribute

Potential data to be used in the asset management focus group include:

- Simulated RADAR data showing capabilities for remotely sensing pavement condition
- High-resolution electro-optic data showing capabilities of assessing assets

Environmental Applications

Paul McAllister and Mike O'Malley of Project Planning served as informants on environmental applications. At this discussion, they provided a detailed list of desired features and attributes that they would like to obtain from the restricted use study, as well as a candidate list of applications.[4] In their joint opinion, however, providing the desired features and attributes should be the primary goal, because all their applications build off these feature and attribute data. Several of the highest priority applications are listed below.

- Faster, better, cheaper identification of locations to create wetlands
- Faster, better, cheaper source of needed data features and attributes on their list (see interview notes for McAllister and O'Malley), including land, water, habitat, and built environment
- Mapping of storm water outfall and drainage
- Any of the others on their list of possible uses

[2] Complete summaries of all informant interviews are provided in Appendix B.

[3] These preliminary lists are meant as examples and certainly are not exhaustive. Further detail on potential data is provided in Deliverable 1.1 (*Radar Sensors for Transportation Applications*) and Deliverable 2.1 (*Electro-optic Sensors for Transportation Applications*). These reports provide a thorough categorization of possible data, down to the level of precise assets that provide such data, for all topics.

[4] Their lists are included in Appendix B as part of the summary of our interview with them.

Potential data to be used in the environmental focus group include:

- Precise land cover maps showing areas for creating wetlands
- Digital-elevation data
- Subsurface mapping based on RADAR data

ITS and Operations

Both Greg Krueger and Jim Schultz addressed ITS issues directly, and this topic was also touched upon in other discussions. Several promising subtopics emerged from these discussions.

- High-resolution (sub meter) map of Metro Detroit region to serve as base for other applications, potentially including VII and Amber Alert response
- Ability to obtain real-time (or near it) information in the event of a MAJOR catastrophic event
- Assistance with demonstrating the value of ITS investments and initiatives on system performance

Potential data and other restricted use technology to be used in the ITS and operations group include:

- High-resolution map of Metro Detroit and perhaps other urban areas
- Synoptic vehicle counts that could permit characterization of system performance and/or determination of vehicle types
- Vehicle speed detection

Inter-modal and Multi-modal Applications

Tim Hoeffner was the primary informant on inter-modal and multi-modal issues within MDOT. To a large extent, this discussion mirrored that related to asset management, with a clear focus on remotely sensing the presence, condition, and use of inter-modal and multi-modal assets. It also produced several promising applications of restricted use technology.

- High-resolution mapping and assessment of assets (such as non-motorized trails)
- Assessment of usage rates at multimodal facilities (e.g., railroad crossings, park-n-ride, freeway rest areas, perhaps even private truck stops for comparative purposes) over time, including time-of-day comparisons
- Adding high-resolution imagery to existing (or improved) GIS data and applications

Potential data and other restricted use technology to be used in the inter-modal and multi-modal group include:

- High resolution imagery to support inventories and assessment of assets and their utilization
- LIDAR-based products for 3-dimensional planning

Traffic Safety and Congestion

Given MDOT's overall mission, traffic safety and congestion were addressed in several of our informant discussions. While John Friend and Jim Culp served as the primary informants for these topics, Greg Krueger, Jim Schultz, and others discussed them at least briefly. In all cases, however, a common theme emerged in regard to congestion—identifying and projecting temporal and spatial dimensions of congestion and re-routing traffic to avoid it in real-time—and this theme clearly overlaps with the ITS and Operations topic.

- Surveillance to identify where recurrent and non-recurrent congestion are and where alternative routes with available capacity are
- Algorithms (such as those that merge data from multiple inputs) that can predict where congestion will be and predict where open alternative routes will be
- Enhanced management of work zone entrance areas, including driver notification, to reduce crashes. Intersections also emerged as a priority location for safety applications.
- Evaluation of signal retiming efforts to determine if delay has been reduced
- Simulated RADAR data to support vehicle counts

Potential data and other restricted use technology to be used in the traffic safety and congestion group include:

- High-resolution products for crash investigations and study of traffic patterns
- Detection and categorization of vehicle types in traffic (e.g., percent commercial)
- Synoptic network assessment

HAZMAT Shipments

Eileen Phifer was the primary informant who addressed HAZMAT-related issues, though Kris Wisniewski also provided some thoughts on this topic. These discussions made it clear the Michigan State Police have the primary role in this area, but that MDOT has the lead on routing. Currently, however, few restrictions are in place, though this may need to change given current concerns for homeland security. In these discussions, the subtopics that stood out were:

- Identifying HAZMAT-hauling vehicles remotely (and without making them visible targets)
- Improving HAZMAT routing
- Possibly, detecting illegal shipping practices (only Blue Water is licensed for such shipments, but MDOT and the Michigan State Police sometimes detect such crossings on other facilities)

Potential data and other restricted use technology to be used in the group addressing HAZMAT shipments include:

- Simulated UAV (unmanned aerial vehicle) data for real-time monitoring of incidents, such as spills
- Mapping products for routing applications
- Simulated tracking data

Border Crossings

Kris Wisniewski was the primary informant to address border crossings, though others, especially Eileen Phifer, addressed it at least briefly. These discussions revealed that border areas reflect all other areas of MDOT operations, and concerns such as traffic congestion, HAZMAT shipments, etc., are present at the borders. Thus, these discussions revealed several subtopics related to border crossings.

- Monitoring/managing HAZMAT shipments across the international border
- Improved operations of road and highways leading to the borders (congestion reduction, safety improvement)
- Improving operations of the border system (optimizing traffic across the crossing alternative in SE Michigan)

Potential data and other restricted use technology to be used in the group addressing border crossings include:

- High-resolution data allowing analysis of queues at the borders
- Precise land-cover data for border projects, such as expansions
- Simulated products for detecting types of vehicles in the queue
- Predictive algorithms for forecasting delay

Homeland Security

Eileen Phifer was the primary MDOT informant to address homeland security. In our discussions with Eileen, several subtopics were revealed, and some of these overlap with other topics. These are listed below.

- Early detection of incidents, along with decision support for moving first responders into the incident area and moving the general public out
- Identifying and tracking HAZMAT shipments via restricted use "tags"
- Improved information exchange between homeland security entities
- Increased monitoring of critical assets, such as border crossings

Potential data and other restricted use technology to be used in the homeland security group include:

- Surveillance products from a number of sources
- Data to support evacuation route planning
- Simulated RADAR data to support vehicle counts

Table 3: Potential Electro-Optical Data for Focus Group Topics

Application / EO Type	Asset Management	Environmental Data Needs	Inter- and Multi-Modal Transportation	HAZMAT Shipments	Traffic Safety and Congestion	Border Crossings	Homeland Security	ITS/ Operations
High Spatial Resolution (satellite, UAV, manned aircraft)	Infrastructure mapping & geo-location, infrastructure inspection, roadside features, inventories	Detailed corridor mapping, base maps	Port and shipping activities, infrastructure and facility mapping, asset assessment, utilization assessment	UAV real time monitoring of incidents	Traffic patterns, study of problematic areas, accident detection & verification, infrastructure failure, fog, avalanches, floods	Traffic queues, infrastructure inspection, parking demand	Surveillance from airborne sensors, intelligence, disaster assessment	Traffic impedance & modeling, congestion detection, travel time, parking demand
Moderate Spatial Resolution MS (satellite)	Green space, land cover change	Support of EA process, classsification, wetlands	Water quality, corridor studies, ATV impacts	Environmentally sensitive areas, route planning, population centers	Alternate route planner	Border mapping	Evacuation route planning, disaster planning	Corridor modeling
Environmental Synoptic (satellite)	NA	Dynamic regional changes	Water quality	Weather conditions in near real-time	NA	NA	Atmospheric dispersal	NA
Hyperspectral (manned aircraft)	Paving material & condition	Precise land cover classification, wetlands	NA	Chemical spill detection	NA	Precise land cover classification	NA	NA
LIDAR (manned aircraft)	Topography data for planning, 3-D mapping of structures	DEM analysis, project visualization, air pollution	Airport glide paths, topography, bathymetry, 3-D airport layout plans	Slope data for runoff models	Air pollution, fog, avalanches, flood risk	Infrastructure mapping	Infrastructure mapping, flood modeling	Vehicle speed, communication sites
Thermal	NA	Water parameters Wetlands	NA	High temperatures	Car counts	NA	NA	Car counts

NA=Not Applicable

Table 4: Potential RADAR Data for Focus Group Topics

MDOT Application / RADAR Types	Asset Management	Environmental Data Needs	Inter- and Multi-Modal Transportation	HAZMAT Shipments	Traffic Safety and Congestion	Border Crossings	Homeland Security	ITS/ Operations
SAR Mapping (satellite, manned aircraft, UAV)	Road roughness, corridors	Wetlands, corridors, right-of-ways, land cover, forest inventory	Line of sight at railroad crossings	Optimum routes, hazards en route, RADAR tags	Vehicle type	Vehicle counts and type	Vehicle type counts, corridor inspection	Base map, RADAR tags
InSAR (manned aircraft)	High resolution road grade maps	Topography, DEMs, feature classification	NA	Optimum routing	Line of sight, steep grades, slope stability	NA	NA	High resolution topography, base maps
Pass-to-pass coherent detection (satellite)	Potholes, sinking roads	Subsidence, elevation increase, anthropogenic change detection	Runway and railroad deterioration	NA	Slope stability	NA	Change detection of area	NA
GMTI (manned aircraft, UAV)	Vehicle counts and speed	Vehicle counts	NA	NA	Vehicle counts and speed	Vehicle counts and speed	Vehicle counts and speed	Synoptic vehicle counts and speed
Ground penetrating RADAR (manned aircraft, ground)	Under road problems, buried utilities	Subsurface mapping (pipes, tunnels, water channels)	Underground utilities, under runway problems	NA	NA	NA	NA	NA

NA=Not Applicable

INVITEES FOR EACH FOCUS GROUP TOPIC

On September 1, 2005, Altarum delivered the list of potential participants (invitees) for the stakeholder focus groups to MDOT (Deliverable 3.1). These invitees, and others who have emerged since Deliverable 3.1 was submitted, are linked to specific focus groups, based on the revised list of topics in Table 2, in the tables below (Table 5 through Table 12). Some invitees are listed for more than group, due to their broad expertise or responsibilities or both. In addition to the invitees listed in these tables, Altarum and its partners in this study, along with members of the restricted use technology community, will participate in the groups. Altarum remains in the process of negotiating the participation of specific individuals from this community, but security concerns prevent their names from being listed here. Furthermore, the Altarum team will remain vigilant in the identification of others potential invitees that may emerge from ongoing meetings with MDOT staff and from initial contacts with the invitees listed below (e.g., an invitee may not be interested in participating but may identify a colleague who might be). Thus, these lists are subject to change as the study progresses, and Altarum will be responsive to MDOT's requests for additions and deletions, as well as active in recruiting new participants if a specific group identifies a need for doing so, e.g., to cover a missing area of expertise deemed important for success.

Table 5: Invitees for Asset Management Topic

Invitee	Organizational Affiliation
Gloria Jeff	MDOT
Kirk Steudle	MDOT
William Tansil	MDOT
Ron Vibbert	MDOT
Leon Hank	MDOT
Susan Mortel	MDOT
Jackie Shinn	MDOT
David Schade	MDOT
Carmine Palumbo	SEMCOG
William MacIntee	Road Commission for Oakland County
Steve Warren	Kent County Road Commission
Ron Young	Alcona County Road Commission
Larry Galehouse	Michigan State University Pavement Preservation Institute
Terry McNinch	Michigan Technological University
Snehamay Khasnabis	Wayne State University
Rob Surber	Center for Geographic Information, DIT
Eric Swanson	Center for Geographic Information, DIT
Tom Udvare	US Army, Tank-automotive & Armaments Command

Table 6: Invitees for Environmental Applications Topic

Invitee	Organizational Affiliation
Gloria Jeff	MDOT
Kirk Steudle	MDOT
Paul McAllister	MDOT
Mike O'Malley	MDOT
Sherry Furman	MDOT
Martha McFarland	Michigan Historic Preservation
Jerry Fulcher	Michigan Department of Environmental Quality
Del Abdella	Federal Highway Administration
Sherry Kamki	US Environmental Protection Agency
Jack Dingledine	US Fish & Wildlife
John Halsey	Archeologist, State of Michigan
Eric Swanson	Center for Geographic Information, DIT
Rob Surber	Center for Geographic Information, DIT

Table 7: Invitees for ITS and Operations Topic

Invitee	Organizational Affiliation
Larry Tibbits	MDOT
Kirk Steudle	MDOT
Greg Krueger	MDOT
Roger Safford	MDOT
Mia Silver	MDOT
Jeff Paniati	Federal Highway Administration
Morrie Hoevel	Federal Highway Administration
Carmine Palumbo	SEMCOG
Tom Bruff	SEMCOG
Brent Bair	Road Commission for Oakland County
Gary Piotrowicz	Road Commission for Oakland County
Peter Sweatman	University of Michigan Transportation Research Institute
Tim Gordon	University of Michigan Transportation Research Institute
Kunwar Rajendra	Michigan State University
Robert Smith	University of Michigan
Steve Underwood	Center for Automotive Research
Ralph Robinson	Ford Motor Company
Frank Cardimen	ITS Michigan
Walter Dunn	Dunn Engineering
Dr. Al Reid	US Army, Tank-automotive & Armaments Command
Gerald Jung	US Army, Tank-automotive & Armaments Command

Table 8: Invitees for Inter-modal and Multimodal Applications Topic

Invitee	Organizational Affiliation
Gloria Jeff	MDOT
Kirk Steudle	MDOT
Leon Hank	MDOT
Rob Abent	MDOT
Tim Hoeffner	MDOT
Tom Krashen	MDOT
Mel Williams	MDOT
Sharon Edgar	MDOT
Pauline Misjak	MDOT
Rick Hamilton	MDOT
Rob Surber	Center for Geographic Information, DIT
Steve Fern	Suburban Mobility Authority for Regional Transportation
Greg Cook	Ann Arbor Transportation Authority
Barbara Hanson	Detroit People Mover
Carmine Palumbo	SEMCOG
Kip Grimes	Wayne State University
Snehamay Khasnabis	Wayne State University
TBD	Detroit Inter-modal Freight Terminal
TBD	Federal Transit Administration
TBD	Federal Railroad Administration
Dennis Wend	US Army, Tank-automotive & Armaments Command

Table 9: Invitees for Traffic Safety and Congestion Topic

Invitees	Organizational Affiliation
Gloria Jeff	MDOT
Kirk Steudle	MDOT
Larry Tibbits	MDOT
John Friend	MDOT
Jim Culp	MDOT
Greg Johnson	MDOT
Greg Krueger	MDOT
Gary Piotrowicz	Road Commission for Oakland County
Tim Gordon	University of Michigan Transportation Research Institute
John Woodroffe	University of Michigan Transportation Research Institute
Mike Shulman	Crash Avoidance Metrics Program and Ford
Walter Kraft	Parsons Brinckerhoff
Mitch Kozera	US Army, Tank-automotive & Armaments Command

Table 10: Invitees for Homeland Security Topic

Invitee	Organizational Affiliation
Gloria Jeff	MDOT
Kirk Steudle	MDOT
Eileen Phifer	MDOT
Jackie Shinn	MDOT
Laura Nelhiebel	MDOT
Sue Fries	Michigan State Police
Steve Fern	Suburban Mobility Authority for Regional Transportation
Eric Swanson	Center for Geographic Information, DIT
Sandy Altschul	Wayne County
Sean Friedland	St. Clair County
Dr. David Gorsich	US Army, Tank-automotive & Armaments Command
TBD	US Department of Homeland Security

Table 11: Invitees for HAZMAT Shipment Topic

Invitee	Organization Affiliation
Gloria Jeff	MDOT
Kirk Steudle	MDOT
Larry Tibbits	MDOT
Eileen Phifer	MDOT
Greg Johnson	MDOT
Laura Nelhiebel	MDOT
Sue Fries	Michigan State Police
Sandy Altschul	Wayne County
Sean Friedland	St. Clair County
Peter Sweatman	University of Michigan Transportation Research Institute
John Woodroffe	University of Michigan Transportation Research Institute

Table 12: Invitees for Border Crossings Topic

Invitee	Organization Affiliation
Gloria Jeff	MDOT
Krik Steudle	MDOT
Eileen Phifer	MDOT
Greg Johnson	MDOT
Kris Wisniewski	MDOT
Susan Mortel	MDOT
Andy Ziegler	MDOT
Laura Nelhiebel	MDOT
Sarah Moore	MDOT
Morris Hall	MDOT
Paul McAllister	MDOT
Curtis Hertel, Sr.	Port of Detroit
Sean Friedland	St. Clair County
Charles Acir	US Army, Tank-automotive & Armaments Command
Bob Prouse	US Department of Homeland Security (Customs)
Neil Belitsky	Detroit-Windsor Tunnel
Dan Stamper	Ambassador Bridge
John Woodroffe	University of Michigan Transportation Research Institute
Robert Smith	University of Michigan
John Taylor	Grand Valley State University
Ian Becking	Canadian Office of Critical Infrastructure Protection and Emergency Preparedness
Kevin Smith	General Motors Corporation
TBD	Ford Motor Company (logistics)
TBD	DaimlerChrysler Corporation (logistics)
TBD	Ontario Ministry of Transportation
TBD	Transport Canada

MANAGEMENT AND ADMINISTRATION OF FOCUS GROUPS

Managing and administering eight sets of focus groups is a challenging and critical task within this study, and this task includes both major logistical and content-oriented activities. Altarum will begin performing these activities at the start of Phase II and continue them until the series of meetings is complete. Examples of these activities include:

1. Obtaining commitments from invitees (turning invitees into participants)[5]
2. Securing facilities at which to hold the meetings and ensuring that these facilities are properly equipped (e.g., with audio-visual equipment, etc.)
3. Identifying individuals to serve important roles (group leaders, facilitations, recorders, etc.) during the meetings
4. Developing materials to facilitate conduct of the meetings (preliminary data, data collection instruments, etc.)
5. Researching topics of interest identified by each group
6. Analyzing the outcomes (data, results, suggested applications) produced by each group
7. Sharing and communicating results across groups

In this section of this report, these plans and protocols are detailed in two broad categories, those associated with planning and logistics and those associated with the content of the meetings themselves.

Focus Group Planning and Logistics

Planning for the focus groups, already underway in Phase I of the study, takes on critical importance in Phase II. This planning effort includes contacting invitees to solicit their involvement, and this first requires approval of the lists of invitees by topic by MDOT. Thus, **early approval by MDOT of the lists of invitees is critical to the successful completion of this effort.** Before any meetings are held, in addition to recruiting participants from invitees, the Altarum team must check and manage schedules, secure facilities, developing briefing booklets and other inputs to the groups, and establish the formats for each meeting. These activities are described in more detail below.

Recruiting Participants from the Invitees and Managing Schedules

For each of the eight identified focus group topics, the Altarum team, pending approval of the respective invitees by MDOT, will contact the invitees to determine their availability and willingness to participate in the study. For non-governmental invitees, this will also include addressing needed consulting arrangements (Appendix C provides an example Altarum consulting agreement.). For many of the participants outside MDOT, this will also include addressing travel reimbursement issues. We expect that all MDOT invitees will participate, pending final scheduling decisions, in the groups with which they have been associated. In some cases, of course, they may choose to identify others in the organization, perhaps drawn from their staffs, who will participate in their place for some of the meetings.

[5] Draft letters of invitations for governmental and non-governmental invitees are provided in Appendices D and E, respectively.

As part of this recruitment process, Altarum will detail the role of the focus groups in this study and explain our expectations for participants. While this includes administrative details related to meeting schedules; travel reimbursement; consulting agreements for non-governmental participants, and the like, it also involves providing participants with adequate background information to allow them to participate fruitfully in the study. To that end, the Altarum team will develop a standard briefing booklet that will be provided to all participants. This booklet will contain both administrative information and technical information related to transportation system concerns and applications and technologies such as remote sensing. Participants will be asked to read and digest this information before attending the first focus group meeting.

Before the first meeting is held, the Altarum team will also analyze schedules for all participants to determine one or two optimal dates, times, and locations for holding the first meeting of the participants. Ideally, this first meeting will include all participants from all focus groups. In practice, however, we are unlikely to be able to find a time and place that suits everyone. Thus, we will aim for two kick-off meetings, with roughly half all participants in attendance at each. These meetings should occur sometime in mid-January 2006. After this first meeting, the Altarum team will work with the groups to determine optimal times for Stage 2 and Stage 3 meetings. We anticipate that Stage 2 may require several meetings for some groups and fewer for others. These meetings will occur from February through September 2006, with the final selection of pilot studies to occur by the end of September 2006.

Securing Focus Group Facilities

The active participation of MDOT employees is essential for the study to achieve its goal of successfully applying restricted use technology toward accomplishing the goals and objectives of MDOT. Thus, the Altarum team will endeavor to make the meetings as accessible as possible to MDOT staff. For example, with MDOT's approval, we plan to make as much use of MDOT facilities as possible. We expect that these facilities will primarily be in the Lansing area; however, if the majority of MDOT participants for a given group are located in a different part of the state (e.g., in Metro Detroit), then we would plan to use a nearby MDOT facility (e.g., the MITS Center in Detroit). If appropriate MDOT facilities are not available, then we would lease necessary facilities in Lansing, southeast Michigan, or another appropriate location. We might also use Altarum facilities in Ann Arbor when this appears to be the best alternative (e.g., when a number of participants are flying into Detroit Metro and others are located in Lansing and Detroit). For large group meetings, such as those planned for early and late in Phase II (Stage 1 and 3 meetings described below), we plan to secure larger facilities in the Lansing area, such as the Kellogg Center on the Michigan State University campus.

Protocols for Conducting Focus Group Meetings

The focus groups will meet several times each, sometimes as a stand-alone group and sometimes in combination with the other groups. In this series of meetings, each stage in the series has a distinct purpose, and this purpose drives many of the details associated with each stage. Thus, each stage has its own logical set of protocols that pertain to all focus group topics. These stage scan be viewed broadly as (1) an initial kick-off meeting that introduces participants to the project and each other, (2) a productive stage in which the focus groups follow a logical sequence from requirements definition to matching restricted use capabilities to these requirements to evaluation of promising pilot studies, and (3) a final debriefing that serves to

select pilot studies for implementation in Phase III. Each of these stages is elaborated on below, and the overall logic is shown in Figure 3.

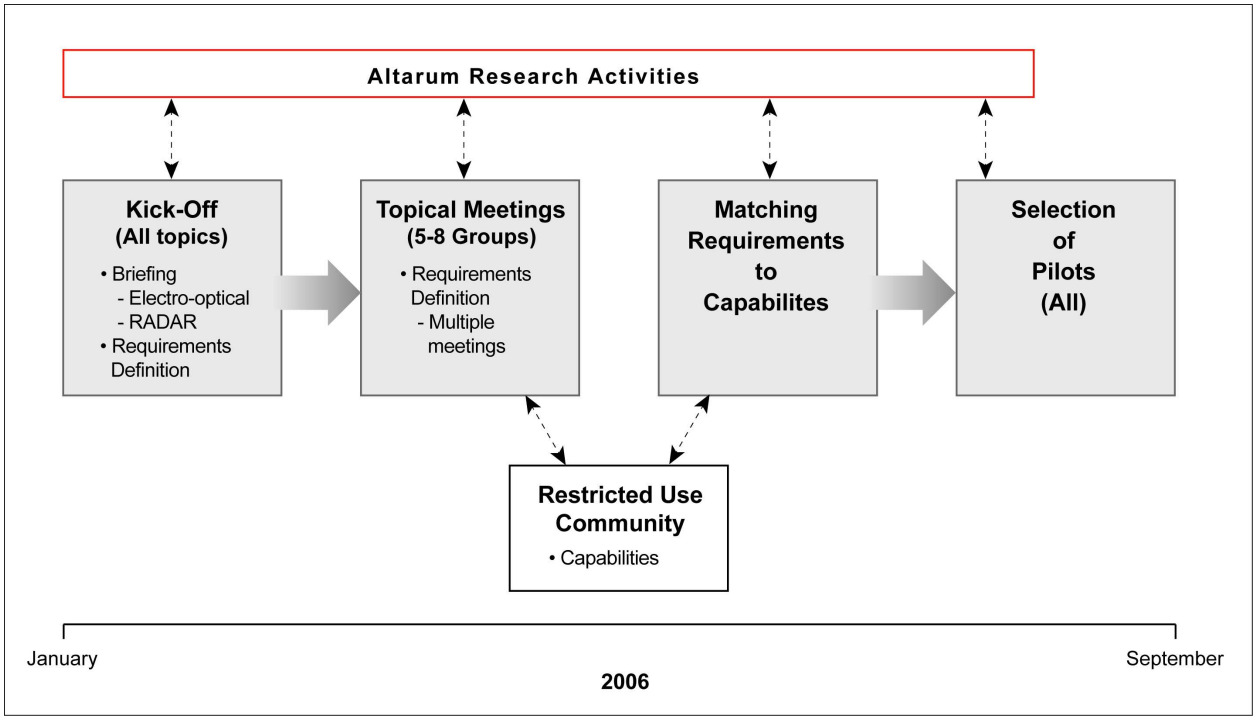
With the topics and invitees settled on, we developed a tentative schedule for conducting the groups that runs from January 2006 through September 2006 (assuming an October 1, 2005 start date for Phase II of the study), along with our overall plan for managing and conducting the groups. This schedule is detailed further below.

Our plan for managing the focus groups consists of several important elements. First, in collaboration with MDOT, we will select one MDOT employee from among the participants within each of the groups to serve as the peer leader of the group. This person will set the technical lead for the participants but will be aided in all his or her leadership activities by Altarum and its subcontractors. Second, Altarum and its subcontractors will provide technical support, facilitation, record-keeping, and other management and administrative tasks to the groups. Third, the groups, as directed by their leader and the Altarum team, will follow a logical progression of activities and outputs from defining transportation system requirements to testing the capabilities of restricted use technology to meet these requirements to selection of pilot studies for Phase III.

Organization of Focus Group Kickoff Meetings (Stage 1 Meetings)

At the first meeting of the focus groups, envisioned as a large, 1.5-day meeting with members of all focus groups present, the primary goal is to brief the participants on the capabilities of restricted use technology, particularly of remote sensing technologies in the RADAR and electro-optical regimes. To a large extent, this first meeting consists of information flow from the study team to the participants, serving as a primer to provide participants with background information that will increase their understanding of the technical capabilities being explored in this study. We anticipate that this briefing will take an entire day.

Figure 3: Planned Sequence of Focus Group Meetings in the Restricted Use Study



To make best use of participants' time, however, the first meeting will also include one-half day of breakout meetings for the eight topical focus groups. These breakout sessions will enable focus group members to become acquainted, to choose a leader, and to begin their first primary task of developing transportation system requirements for restricted use technology. This will also provide the study team and the participants with an opportunity to select optimal times for subsequent, Stage 2, meetings.

Given some of the overlap in needs and potential applications across the topics, we also expect some collapsing of the groups to occur in the transition from Stage 1 to Stage 2 meetings. Based on analysis of the MDOT information interviews, we predict two likely avenues for this to occur. First, as described earlier, we observed a consistent focus on managing and assessing assets for both the asset management and inter-modal and multi-modal application areas. Thus, we can forecast the emergence of a new theme centered on asset management across all modes as the groups progress from Stage 1 to Stage 2. Likewise, we found similar consistency between the border crossing, homeland security, and HAZMAT shipment groups, and can foresee the emergence of a new, collapsed group focused on security applications for transportation. In our graphical display of the focus group schedule in Figure 4, we have shown these merged groups and their relation to the eight revised topics listed in Table 2.

Organization of Working Focus Group Meetings (Stage 2 Meetings)

After the one or two focus group kick-off meetings, the Altarum team will embark on a series of focus group meeting with the individual groups. At these meetings, participants, supported and facilitated by the Altarum team, will delve deeply into their respective topics to examine how restricted use technology could have a significant improvement on transportation system management or operations of both within the topical area. These meetings have one overarching goal: **elaboration of a set of transportation system requirements for potential applications of restricted use technology for each of the eight topical areas and comparison of these requirements to the capabilities of restricted use technology**. Thus, the primary outcomes of this stage are the requirements documents, a set of derived products showing the capabilities of restricted use technology, and an evaluation of the match between requirements and capabilities.

The format of these meetings likely will vary according to the preferences and scheduling needs of each group, but many general principles will be applied. First, with MDOT's concurrence, each group will have a group leader assigned to it. Second, all formal group meetings are expected to last about one-half day each, and all meetings will include a facilitator and recorder, and these will be come from Altarum and its partners (Cambridge Systematics and ISciences). Altarum will also provide any administrative and technical support required to make the meetings a success. Such administrative support needs might include: preparing agendas, preparing and distributing meeting materials, coordinating and providing necessary audiovisual equipment, taking meeting minutes, etc. The technical support from Altarum and its partners will include assisting group leaders (before and during the meeting), providing relevant simulated data and imagery, analyzing data and other outcomes of the groups, and formulating meeting results into precise statements of MDOT requirements. Some outcomes of the meetings will be questions about the nature of, or the quantification of, MDOT requirements. These will be researched and addressed by the Altarum team before meetings are held with members of the restricted use community.

Participants from the restricted use community will participate in Stage 2 meetings with other participants to the extent that they see fit to do so, and more critical to their role in the project, will hold their own meetings to respond to the requirements documents and to demonstrate capabilities and produce derived products. These meetings can also include other participants who volunteer to pursue a security clearance and who have successfully passed through that process.

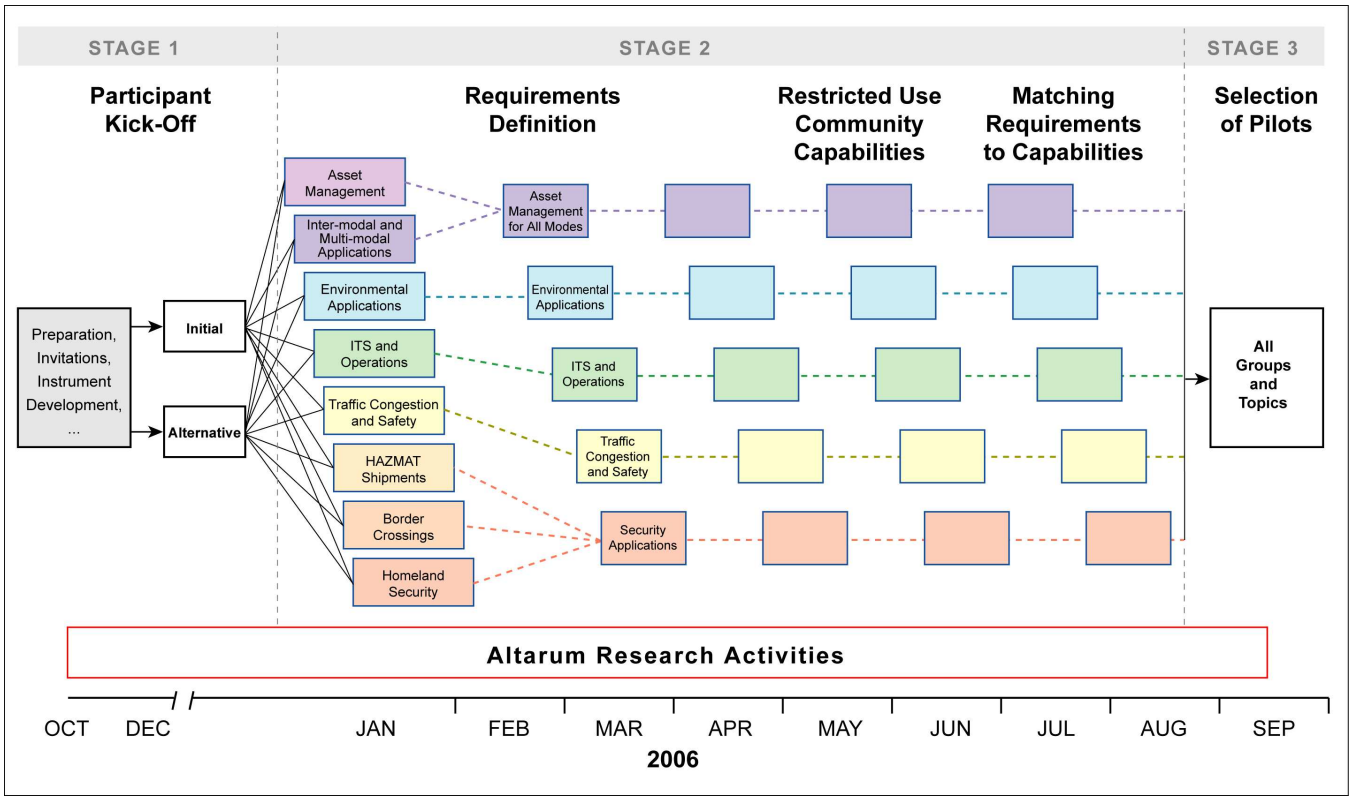
Organization of Meeting to Select Pilot Studies (Stage 3 Meeting)

Once the comparison of requirements to capabilities has been completed for all topical groups, we will once again convene a meeting of all participants to select from all candidates the most promising pilot studies for Phase III. While we expect to see cross-fertilization between groups earlier than State 3, driven by the Altarum team and its involvement in all groups, as well as from participants who are part of multiple groups, and we further anticipate that such cross-fertilization will contribute significantly to development of promising applications, we do not plan to have any large group meetings during Stage 2. The potential pilot applications developed by each group will be compared in a multi-group meeting so that the likely risks, costs, and benefits of all can be compared, weighted, and ultimately vetted by MDOT senior management. Thus, this last meeting will be scheduled for a full day, and it will include briefings from each of the groups to the other groups (with Altarum's assistance), breakout discussions of the relative merits of all proposed pilots, and systematic evaluation and assessment of the value and potential risks of each proposed pilot. Through a weighting scheme rooted in multi-attribute utility approaches, we will make final recommendations for pilot studies to MDOT. In the end, MDOT senior management will have approval over selected pilots.

TENTATIVE SCHEDULE FOR CONDUCTING FOCUS GROUPS

Conducting the focus groups is a major task within Phase II of the project that lasts 12 months; Figure 4 shows the overall schedule for Task 3.2 (conducting the focus groups) over these 12 months. As shown, for the first three months of the phase, we will concentrate on preparing for the actual meetings, which are projected to begin in mid-January 2006, assuming an October 1 start date for Phase II (if the start date is delayed, then the schedule will, too). These preparatory activities include contacting invitees to request their participation n the study; obtaining, comparing, and managing participant schedules to identify an optimal time for the initial focus group meeting; scheduling and reserving facilities for the meetings; developing data collection instruments, developing an delivering briefing booklets for participants; and developing data-collection instruments for use in the meetings.

Figure 4: Tentative Schedule of Focus Group Meetings



Following this period of preparation, we will spend nine months conducting the focus groups, and this period focus on developing requirements, demonstrating capabilities, matching capabilities to requirements, and selecting pilot studies to implement in Phase IIII. We plan to start this process in January 2006, assuming an October 1, 2005 start date for Phase II. Thus, in January 2006, we plan to convene the initial meeting of the focus groups and anticipate needing two such meetings to permit all participants to attend. Following this kick-off stage, each of the eight focus groups will meet multiple times over the course of Phase II of the study. These meetings will progress from defining transportation system requirements to assessing the

capabilities of restricted use technology to meet these requirements to selecting the most promising pilot studies for Phase III.

APPENDIX A: Protocol for Interviews with Key MDOT Informants

INFORMANT:
TOPIC:
DATE:

I. Explain to contact why he or she was contacted re: a specific application area, mentioning the subtopics already identified within the area in question.

II. Prompt contact for details concerning MDOT's tasks and activities re: the application area of interest. What are MDOT's roles and responsibilities in this area?

III. Prompt contact for an estimate of the amount of resources (most likely $, but perhaps other units, too, such as FTEs or the like) that MDOT devotes to the tasks or activities in question, including how much outside help (contractors, for example) it uses.

IV. Prompt contact for details concerning how (tools, data, staffing, contracting, etc.) MDOT accomplishes these tasks and activities (meets its responsibilities).

V. Prompt contact for details on specific tasks or activities that are particularly vexing in regular operations (i.e., those that need improvement, possibly with restricted use technology).

VI. Prompt contact for a wish list of inputs that would be most valuable in helping the contact's unit complete its work (i.e., inputs that restricted use technology may be able to provide).

VII. Prompt contact for other application areas (beyond the eight already identified) that he or she believes could be helped by restricted use technology). [**Note**: some contacts have already had this opportunity at least once during development of the project. Thus, for those, approach this as a validation of earlier ideas, a chance to rethink priorities, etc.]

VIII. Prompt contact for names of people that he or she considers to be important stakeholders or experts that should be involved in the focus group process.

IX. Ask contact if he or she is interested in obtaining a security clearance.

APPENDIX B: Summaries of Informant Interviews

This appendix includes summaries of the eight interviews with MDOT staff and the one interview with a CGI staff member completed by Altarum as one method of preparing this focus group management plan. The summaries, listed according to the names of the informants, appear in the following order:

- Greg Krueger
- Paul McAllister and Mike O'Malley
- Bill Tansil and Ron Vibbert
- Kris Wisniewski
- Eileen Phifer
- Jim Schultz
- Tim Hoeffner
- Rob Surber (of CGI)
- John Friend and Jim Culp

Summary of Interview with Greg Krueger

MAIN TOPIC: ITS

Using the template developed for discussions with key MDOT informants, Richard Wallace, Tim Doyle, and Greg Leonard held a phone conference with Greg Krueger, MDOT's leader in the ITS application area, to validate and confirm previous directions for the restricted use technology study in the ITS arena, as well as to better understand what MDOT is doing in the ITS area and how restricted use technology might contribute to these efforts. The call lasted about 0.5 hours.

1. Greg (GK) said the main objective of ITS within MDOT is "to improve transportation safety and efficiency through the use of technology." He emphasized that the main problem facing the ITS program within MDOT is justifying its existence. The people working in ITS have a hard time quantifying (e.g., in terms of delay reduction or the like) the benefits of ITS and have to fight to maintain their funding. He did not identify any detailed examples of how they are currently evaluating the performance of MDOT's ITS. Currently, ITS funding is about $8 million per year, and he sees little opportunity for that to grow. MITSC receives most of the $8 million just for normal operation of the center. Effectively, MDOT does not direct any funds toward ITS research. When asked about plans to expand ITS in Michigan to other regions (beyond SE), he noted that there was an RFP on the street to plan for ITS expansion in and around Grand Rapids.

2. GK confirmed his interest in a high-resolution map of the Metro region to serve as a base on which to apply applications such as monitoring and updating attributes. He stressed that he wanted sufficient resolution to detect, for example, narrow alleys and foot paths that someone might try to use to escape law enforcement (during an Amber Alert, for example). The high resolution would help him define an appropriate perimeter for a search or blockade.

3. GK confirmed that he would like to obtain near real-time data/information in the advent of an extreme incident. He clarified that here he means a MAJOR CATASTROPHIC INCIDENT—like a bridge collapse! Where this to occur, however, he could not detail what inputs he would like to receive in as close-to-real time as possible, because he does not know what is available from restricted use sources.

4. GK indicated that regional operations (ROOs in FHWA talk—regional operating organizations) currently is the hot issue in the operations realm. The goal is to link the 240 units of government within the SEMCOG region with control over some number of roads, highways, or assets. ITS MI/SEMCOG has a planning grant (~$250K) to look into how to do that. *(Richard's note: Dick Beaubien, of Hubbell-Roth-Clark and head of ITS MI's Incident Management Committee, appears to control use of this grant.)*

5. In his new job as the head of ITS within MDOT, GK will be looking hard at developing a statewide architecture and deployment plans for the rest of the state (beyond SE). He has and will have RFPs for contractors to complete some of this work. He does not, however, see the funds available to actually deploy. Greg moves to his new job (MI ITS Director) October 1,

2005. Though his new position is based in the Lansing HQ, he will be traveling a lot and not always in either his Lansing office or southeast Michigan.

6. GK did not see much of a link between restricted use and either VII or 511, but perhaps a little more for the former (the high-res map baseline). He thought help with snow removal (SEMSIM) might be useful. When asked about how the RUTS project might support the 511 project, he did not see any applicability.

7. When prompted to name stakeholders who he would like to see involved in an ITS-oriented focus group, he gave an extensive list, reproduced below.

- Carmine Palumbo, SEMCOG
- Frank Cardimen, TIA and ITS MI
- Gary Piotrowicz and Brent Bair, RCOC
- Roger Safford, MDOT
- Bill Tansil, MDOT
- Whoever replaced GK at MITSC, MDOT
- Walter Dunn, Dunn Engineering (the contracting firm that operates MITSC)
- Walter Kraft. Parsons Brinckerhoff
- Jeff Paniati, FHWA

8. MITSC will be providing traffic data for management of Super Bowl XL, but is not working directly with the federal government. Furthermore, Greg did not indicate that MDOT is being tasked by others to support security or play a significant traffic management role outside of the provision of MITSC data.

Summary of Interview with Paul McAllister and Mike O'Malley

MAIN TOPIC: Environmental Applications

Using the template developed for discussions with key MDOT informants, Richard Wallace and Tim Doyle traveled to Lansing and met with Paul McAllister (Environment Section) and Michael O'Malley (Environmental Section) to validate and confirm previous directions for the restricted use technology study in the environmental arena, as well as to better understand what MDOT is doing in the environmental area and how restricted use technology might contribute to these efforts. Our discussion lasted about one hour. Both Paul and Mike participated actively in the discussion and the notes below do not really distinguish between their comments. At no point did they express conflicting needs or information.

1. Paul and Mike came to the meeting with a list of data needs and possible uses of the data. We spent quite some time discussing their list, and a slightly revised version of the list (modified by Paul after the meeting) is attached. While they indicated that identifying areas in which to create wetlands (to mitigate those destroyed by highway and road construction at about a 2:1 ratio) is perhaps the use that they would rank first, they preferred to focus on the data needs (water, land, flora and fauna, and built environment), because with the data they can accomplish all the listed uses and more. Thus, their main need is for better, less expensive, higher resolution, etc., data.

2. They identified endangered species compliance as another of their most pressing issues. Using the Karner Blue butterfly as an example, we indicated that counting individuals likely is not possible, but that IDing appropriate habitat is. They responded that habitat identification, maintenance, etc., is exactly their concern.

3. Species concerns, like most all of what they do, is heavily driven by federal and state regulations. Thus, they face a mountain of legislation and interact with a host of federal and state regulatory agencies. They identified many by name as likely stakeholders:

- Martha McFarland, State Historic Preservation
- Jerry Fulcher, DEQ
- Del Abdella, FHWA
- Sherry Kamki, EPA
- Eric Swanson, CGI (within DIT)
- Jack Dingledine, U.S. Fish and Wildlife
- John Halsey, State Archeologist
- Sharon Furman, MDOT Metro Region Office (every region has at least one environmental person, they indicated)

4. They indicated that this project would especially help their work if it could result in less field work (very expensive and time consuming for them), as well as make their analyses more defensible (i.e., in public forums; to lawmakers, local officials, etc.). Data quality improvements are also very important to them.

5. They expressed concern that everything done be in a format that they can use (e.g., Arc products). If data and data products end up in file formats that they cannot use, then the study is not so useful to them.

6. When asked about MDOT's budget for their work, they responded that the budget is driven by the need to meet regulatory requirements to obtain federal funding. Not counting staff salaries (for about 15 Lansing people), they identified about $1.5 million or so per year to do the Environmental Section's work, plus another $8.5 million for GIS hardware, software, data. They estimated about $20 million/year including what is done at MDOT regional offices. They do let contracts for imagery products and other consulting services, such as preparing EIS.

9. They noted that federal and state regulations, standards and policies change over time. For example, the need for noise reduction around built up areas has changed. The new noise policy now provides an opportunity for MDOT to install "Type II" noise walls for roadways that were constructed prior to existing noise regulations if there was existing residential area nearby. Note that new residential construction near existing roads and highways do not qualify for any noise reduction on MDOT's dime, though developers can add it themselves.

10. Their job focuses on: 1) front-end planning (i.e., environmental impact statements) for both new construction and major reconstruction and 2) operational management of resources (i.e., environmental assessment of existing roadways, bridges, etc.).

11. They emphasized that they need to continually update the environmental features and their attributes in their data bases (data layers), because many change over time. Again, the features of interest are attached below.

12. They noted that having these data in place can reduce construction contractor cost and thus the amount MDOT is paying them. They make field reviews to verify contractor compliance of environmental requirements.

13. They are responsible for environmental clearance of road projects only for "M," "US," "I," and any other state roads, as is true for most of the rest of MDOT. They made little mention of their roles for other modes of transportation.

14. They discussed multiple categories of land use/topography that they are most interested in. Four were discussed: urban, farmland, forested, and water features.

Their list of features to identify and possible uses for the data follows on the next page.

Features Environmental Section Would Like to Be Able to Identify:

LAND
Land forms, both current and prehistoric
Topography and elevations

WATER
Water features, both current and prehistoric
Drainage
Hydrology, both above ground and below ground
Wetlands
Water quality

PLANTS and ANIMALS
Vegetation
Ground cover
Wildlife habitat

BUILT ENVIRONMENT
Land use
Historic structures
Recreational Trails
Archaeological sites
Fence lines
Contamination or hazardous waste
Buildings, foundations, etc., through tree cover

Some Possible Uses for Data

Storm water outfall mapping
Evaluation of drainage courses/drainage area
Evaluation of habitat connectivity
Wetlands delineation
Land use evaluations including initial evaluations of potential impacts to parks
Detour planning and evaluating the impacts of detours
Evaluating tree removals
Evaluating potential noise impacts (drive way locations and receptor locations)
Initial screening for the presence of historical structures
Illegal roadside tree cutting
Counting cars (plaza, rest areas, carpool lots, roads, intersections)
Monitor rest area activity day or night
Vegetation management
Endangered species habitat identification
Spills or dumping in waterways or on land
Coastal zone and dune management

Summary of Interview with Bill Tansil and Ron Vibbert

MAIN TOPIC: Asset Management (plus a little on GIS)

Using the template developed for discussions with key MDOT informants, Richard Wallace and Tim Doyle traveled to Lansing and met with Ron Vibbert (RV) and Bill Tansil (BT) of the Asset Management Division to validate and confirm previous directions for the restricted use technology study in the asset management arena, as well as to better understand what MDOT is doing for asset management and how restricted use technology might contribute to these efforts. Our discussion lasted about 1.5 hours, and Bill was present for about the second half.

1. The discussion began with a reiteration of previously IDed possible applications (see bullets below), and Ron confirmed that these still make sense as candidates.

- High-resolution map mosaic of SE Michigan
    - Improve positional accuracy of GIS data
    - Provide mapping accuracy needed for VII success
- Reduce expense of obtaining statewide GIS imagery
- Improve asset management prioritization
- Remote assessment of pavement condition
    - Shortened data collection time, less subjective assessments, electronic data

2. RV emphasized that asset management involves tracking "network condition over time." Thus, asset management needs a good inventory of what assets the department has (roads, highways, bridges, signs, drainage ditches, pump housings, traffic signal cabinets, traffic volume, % commercial traffic, origin and destination data, etc.) and their condition and other attribute data. These data are expensive to collect, maintain, and update. Effectively, the section's job is to create, populate, maintain, and update a massive data base of this needed information. The data base is organized around a unique physical reference number for each piece of asset (note that highways and roadways are broken into segments but segment size, length may differ depending on the associated attribute data→dynamic segmentation).

3. Ron (and later Bill) explained the three levels of pavement condition surveying done.

- One employee drives 12,000 miles of the main network and updates a database of pavement condition based on a "windshield survey" (actually, this employee sits in the passenger seat and has a driver). This survey is done at the most general level, rating the road on a 1-5 scale, along with a few other characteristics. This costs about $100K/year.
- The pavement engineering folks at MDOT use laser and imagery system to assess cracks, roughness, IRI, etc. They cover the entire MDOT system every two years. This costs about $350K/year.
- The Asset Management Council, of which MDOT is only one member (along with county road commissions, townships, cities, etc.), also conducts a yearly windshield survey.

4. As a result, pavement condition data really come in two flavors: (1) that arising from physical inspection of one sort or another and (2) engineering calculations based on statistical analysis of historical data. The first is a maintained in the database noted in #5 below, and the second also ends up there. When these two sources conflict, the Asset Management Section does **not** play

the role of arbiter. Rather, regional and other field engineers work with the pavement engineers back in the C&T shop to reach resolution.

5. MDOT uses the data to look at the big picture (concrete v. asphalt globally, for example), and they manage (in their comprehensive database) the data that the engineers and others need to examine specific segments, asphalt mixes, etc. RV spent a fair amount of time talking about this database, implying that the populating, maintaining, and distributing this asset-related data was one of the primary functions of the Asset Management Section.

6. Neither Ron nor Bill could give a total budget for the Asset Management Section. The impression is that the size of MDOT's budget for the Asset Management Section is relatively small (MDOT staff and database maintenance) relative to its potential impact. In RV's view, nearly all of what MDOT does is part of its overall asset management function.

7. Each bridge must be inspected, by federal law, once every two years, and this data of course is also in the database (literally, all physical assets in asset management).

8. David Shade is responsible for collecting data on the number and types of vehicles (15 classes of vehicles, but the key parameter is percent commercial). David also is responsible for MDOT origin-and-destination studies. All these data are used for planning, modeling, etc.

9. BT explained that the primary benefit of restricted use technology within asset management would be to extend the reach (data from more places) without adding resources: enable them to do more for less. In addition, both Bill and Ron indicated that getting better data (what their internal customers really want) in an easier to use form is the secondary wish.

10. When asked to ID stakeholders for focus groups, they identified:

- Eric Swanson, CGI (responsible for state geographic framework)
- Members of the Statewide Pavement Management Advising Committee

11. When asked if highway operations would do anything differently without the Asset Management function, Ron answered "no, not in the short run." Subsequent discussions indicated, however, that the primary impact of asset management was to influence longer-term improvements in the way MDOT performed its road-building, bridge-building, and maintenance functions.

12. One reason for maintaining data on MDOT assets is to identify where immediate attention is needed to avoid liability. The example given was the potential MDOT liability for a sign being missing (e.g., ice on bridge) that is determined to be a contributor to a crash or other incident.

Per Follow-up Phone Call with Ron Vibbert the Following Day

- The asset management database is built around a physical road reference system that does allow topological linking of database attributes. Linking this to the GIS, however, is difficult because of differences in the data structures and other technical concerns. Certainly, MDOT's GIS experts can and do link, but this is not for the novice and very difficult when working with non-linear features. The asset management database focuses on linear features, but also includes point (e.g., bridges, signs, etc.) and area (e.g., an interchange) features.
- Both MDOT and CGI are looking at adopting Oracle Spatial as the database underpinning of their respective domains. This should help solve the linkage problem described above, but may give some incentive to move away from ESRI within CGI (e.g., to Intergraph's GeoMedia or some other package). Note: MDOT does not exclusively use ESRI products by any means. Caliper's Transcad, for example, is used quite a bit.

Per an Even Later Conversation with RV (30 September 2005)

- RV informed us that the state Public Transportation Management System data are also included in the asset management database.

Summary of Interview with Kris Wisniewski

MAIN TOPIC: Border Crossings

Using the template developed for discussions with key MDOT informants, Richard Wallace, Greg Leonard, and Bob Shuchman met with Kris Wisniewski of the Inter-modal Policy Division (within Planning) to validate and confirm previous directions for the restricted use technology study in the border-crossing arena, as well as to better understand what MDOT is doing related to border crossings and how restricted use technology might contribute to these efforts. Our discussion lasted about 1.25 hours, and Bob joined the discussion about ten minutes in.

1. The discussion began with Richard briefly describing the genesis of the project and the process that led us to have border crossings as a potential application area and Kris as an informant. Next, Kris was asked to describe MDOT's role at the borders, as well as to explain the roles of other agencies with border responsibilities (such as Customs) and how MDOT interacts with these. This topic dominated the entire discussion, and most of the numbered points that follow pertain to Kris's explanation of border operations.

2. First, Kris recommended that we take a look at a couple documents that he thinks will be informative. The first is one-or-two-page description of MDOT's goals for the borders outlined by the State Transportation Commission. The second is a longer document from within MDOT that Kris or Sarah Moore can send us. (He also mentioned a long presentation in PowerPoint, which we have.)

3. Michigan has four major crossings (Ambassador Bridge, Detroit-Windsor Tunnel, Blue Water Bridges, and International Bridge), plus a few smaller ones (rail, ferries). Of these, MDOT owns the latter two, while the first is privately owned, and the tunnel is owned jointly by Detroit and Windsor and privately operated. Of the two owned by MDOT, it fully operates both sides of International and the American half of Blue Water). They lease space to Customs at the Blue Water Bridge (MDOT sold property to CBP to build a new facility at Sault Ste. Marie) and maintain the structures of these bridges. The Canadian components are Crown companies (national level sanction, but receive no federal funding—must earn their own way). The person in charge of International Bridge reports directly to Kirk Steudle, while the person in charge of Blue Water reports to Metro Region engineer Greg Johnson. Of the four major crossings, only Blue Water is allowed to handle HAZMAT shipments (although the Ambassador Bridge allows certain companies to transport hazardous materials across its bridge).

4. For the Tunnel and Ambassador Bridge, MDOT's main role is in providing travelers access to the Bridge and Tunnel. Historically, federal law did not allow any state to provide a direct link from private facilities to highways; that law has been changed, and MDOT will be providing direct access from the freeway to Ambassador Bridge (not possible at the Tunnel, which accesses Jefferson, another MDOT road). Kris also pointed out that, nationally, the private or state/local government-held crossings are the minority (38 of ~164), but some of the biggest economically (Ambassador, some in New York, etc.).

5. A new crossing in the Detroit region is one of the hottest topics right now. Several proposals are out there, and the NEPA process is underway. The owner of the Ambassador Bridge does not support the new crossing, because it competes with his enterprise. Kris then spent a bit of time discussing some of the practices employed by the Ambassador Bridge operators that cause difficulties for MDOT. A preferred alternative will be selected in about three years.

6. The MDOT-owned bridges are self-financing (from the tolls), and Blue Water makes enough to subsidize other programs. Since 9-11, however, MDOT has poured additional funds into the bridges to upgrade the facilities, approaches, etc.

7. According to Kris, DHS takes little interest in the bridges, save to worry about its operations and safety of its staff. MDOT, for example, is responsible for the security of the structure at International Bridge.

8. Bob asked Kris who gets blamed for border congestion. Kris replied that this is complicated and addressed causes rather than blame. Essentially, he said, delay is caused by Customs and its procedures. Prior to 9-11, it had been 20 years since a slot had been added at the U.S.-Canadian border—all resources went to US-Mexico border. Now, commercial trucks must send their manifests to Customs electronically one hour before arriving at the border. This has helped throughput/reduced delay. As he said, MDOT and Customs clearly have conflicting missions—MDOT is for efficient flow and Customs for security, which inevitably prevents flow. The FAST (for trucks) and NEXUS (for commuters) programs help with this conflict. Soon, all trucks will have to fully scanned electronically, and this will add delay (takes at least one extra minute per truck to accomplish). He suggested that we visit a few ports of entry (Tuesday through Thursday, 11-2 or 3ish recommended) to see how things operate.

10. Kris was not sure how restricted use could help with borders, but emphasized that anything that helped them estimate or reduce delay would be helpful. Existing tools and models do not forecast that well, he said. Customs also has a forecasting tool (Border Wizard). DHS has challenged them to reduce delay by 25 % in the short term. He is not sure how they can measure that or demonstrate it. He also mentioned that borders would be aided by many of the same things that affect the rest of MDOT's assets, such as help with environmental analysis and project planning. *Note: Paul McAllister is MDOT's environmental person on the major Blue Water reconfiguration project that Kris is managing.*

11. Kris also mentioned that improving operations of the roads and highways that provide access to the borders is also important (systems thinking). He mentioned the high %s of truck traffic on I-69 from Port Huron to Flint (about 90%) that came across the border, including the famous Canadian garbage trucks, with similar but somewhat lower %s for I-75 toward Toledo. Because MDOT/Blue Water charges by number of axles and Ambassador by weight, many longer-distance trucks come in fully loaded via Blue Water and return to Canada empty via Ambassador (according to Kris, travel time between Toronto and Chicago is the same, regardless of which of the two crossings is used).

12. Kris mentioned several folks who should be involved in the focus group process related to border issues, including Greg Krueger, Canadian ITS officials (Ontario and federal), bridge

operators (Morris Hall at Blue Water, etc.), Customs/Port Directors (such as Bob Prouse at Port Huron), local officials (such as Sean Friedland of St. Clair County), emergency management agencies, DHS representatives, and Michigan State Police. He said Eileen Phifer will know who to include from the emergency- and security-oriented agencies.

Summary of Interview with Eileen Phifer

MAIN TOPIC: HAZMAT and Homeland Security

Using the template developed for discussions with key MDOT informants, Richard Wallace, Tim Doyle, and Bob Shuchman traveled to Lansing and met with Eileen Phifer of MDOT's Safety Administration to validate and confirm previous directions for the restricted use technology study in the HAZMAT and homeland security areas, as well as to better understand what MDOT is doing related to HAZMAT shipments and homeland security and how restricted use technology might contribute to these efforts. Our discussion lasted about 1.25 hours.

1. Eileen (EP) clarified MDOT's role regarding HAZMAT shipments by informing us that MDOT is the routing agency and the Michigan State Police is the enforcement agency. Nationally, DOTs typically classify designated (i.e., preferred) routes and restricted (forbidden) routes. MDOT, however, has not designated any routes, though Eileen sees value in doing so. Furthermore, EP said they do not place any temporal restrictions on HAZMAT, e.g., daytime versus nighttime shipments. She also confirmed that, of the international border crossings, only Blue Water Bridges, as well as the cargo ferry service, is approved for transport HAZMAT (i.e., Ambassador Bridge and Detroit-Windsor Tunnel are NOT approved for HAZMAT transport, while International Bridge has some limited approval). Of course, MDOT's Environmental Committee also plays a role in HAZMAT issues.

2. In the realm of homeland security, MDOT works with numerous other agencies (state, federal, and local). The Emergency Management Division of the Michigan State Police (MSP) is the leader for homeland security in Michigan. Eileen works with this group on a daily or near daily basis on everything from grant applications to strategic issues to data-sharing issues. She noted that she works closely with Sergeant Sue Fries of the MSP's Motor Carrier Division.

3. MDOT, under EP, has formed a group called TRANSRAP (Transportation Risk Assessment and Protection) for examining security and risk concerns associated with transportation. Eileen chairs the group, and we all agreed that this group should all be invited to join any focus group process related to homeland security. Eileen said that she would send us a list of members, affiliations, etc. The MSP is represented on the committee.

4. Within homeland security, Eileen sees MDOT playing mostly a support role. Even for its own facilities/assets, MDOT does not play a patrol or enforcement role; MDOT does, however, canvas its facilities regularly and reports any concerns detected via dialing 911. Where MDOT is involved in protection of its own assets (e.g., Blue Water Bridges), this responsibility belongs to the facilities manager/engineer in charge.

5. EP and certain MDOT staff have received training on homeland security topics. EP and others use this to identify security/risk concerns at MDOT facilities, and these concerns are passed on to project managers and engineers responsible for design and the like.

6. EP did not much explore specific methods or tools that she and her staff use, but she did say that some are at least somewhat formal approaches to analyzing risks and system vulnerabilities.

7. EP explained that MDOT has some responsibility for ~200 private, public-use airports in MI. For these, MDOT is responsible for security planning and notification (i.e., of a no-fly zone put into place).

8. Though EP's area is called Safety Administration, they are not much involved in road design and vehicle safety. This falls into Traffic & Safety under John Friend. EP's group is concerned, rather, with the safety of the 3,000 or so MDOT employees (MIOSHA has responsibility for MDOT's contractors, but MDOT assists in this role). Again, this is not so much related to traffic in construction zone (again, falls into Traffic and Safety), but more to do with reporting and the liability (work with Attorney General).

9. The Safety Administration as it currently exists has been in place only three years, but it incorporates many of the tasks, roles, etc., that Eileen was doing previously to the current organizational structure. These days, they engage in a great deal of information exchange with those in emergency management, both within Michigan and without (conference, etc.).

10. When asked about issues that are particularly vexing for her group these days, she responded with:

- Need for real-time information (especially at the borders)
    - MDOT and its partners in security concerns worry about identifying where incidents are, moving emergency responders in, and moving the general public out when an incident occurs
    - They would like to identify what HAZMAT is coming in, when, where, etc.
    - Co-location of MSP at MITSC helps with information exchange. MITSC is adding some more cameras to monitor border traffic.
- She indicated that the MSP already is running a plume model at its Emergency Operations Center

11. EP thought it would be useful to be able to ID HAZMAT vehicle from the sky (e.g., labeling on top or some sort of electronic tag—the latter perhaps better because it does not let a potential terrorist know which vehicles to strike). We discussed the possibility that these vehicles might use a variant of the tagging procedures used by the military to identify its vehicles from the air.

12. She is interested in linking various sensors with communication devices (ideally wireless) to allow for easy access to what monitoring equipment is picking up. She wants her group to be on the leading edge of critical safety and security issues, not on the lagging edge (finding out late).

13. She agreed that all of the TRANSRAP team could/should be part of homeland security focus groups. She mentioned Sgt. Sue Fries of MSP by name, as well as Tom Krashen of MDOT (Multimodal, Aeronautics). She thought that local fire and police also should be involved.

Summary of Interview with Jim Schultz

MAIN TOPIC: ITS

Using the template developed for discussions with key MDOT informants, Richard Wallace, Greg Leonard, Bob Shuchman, and Tim Doyle met with Jim Schultz of MDOT at Altarum to validate and confirm previous directions for the restricted use technology study in respect to ITS applications, as well as to better understand what MDOT is doing related to ITS and how restricted use technology might contribute to these efforts. Our discussion lasted about one hour and then continued informally over a working lunch.

1. Jim Schultz (JS) reminded us that Greg Krueger now has primary responsibility for ITS within MDOT, though Greg's new position means that he will no longer be running the MITS Center. JS also suggested that we include Mia Silver to represent MITSC, until a successor to Greg is chosen for any ITS-related focus groups.

2. JS informed us that MITSC receives $8 million per year in funding as a line item in MDOT's budget. Of this, the Courtesy Patrol takes about $3 million. Currently, the Courtesy Patrol includes 32 vehicles, five of which are tow trucks. JS thinks that the total ITS budget will grow in the future.

3. JS informed us that Steve Underwood of CAR us working on a strategic plan for VII on behalf of MDOT. We discussed one purpose of such a plan was to improve MDOT's chances of winning a field operational test (FOT) for VII.

4. JS focused his discussion on a long-term vision (say 20 years) for transportation and expressed the view that the strategic plan should also serve that purpose. In his vision, the state would have all traffic signals interconnected (wireless), and he has asked Brent Bair of RCOC to write one page vision of his vision for of this for RCOC. Currently, Jim reported, RCOC spends about $1 million per year to SBC for phone-line links for data flowing to and from SCATS signals. JS pointed out that school districts and other civic groups (such as Wireless Oakland and Washtenaw) have networks (including fiber for backhaul) that transportation agencies might be able to use. JS's vision also includes cameras near all major intersections, malls, and other points of interest to transportation system operators.

5. JS believes that the feds (FHWA) want only one FOT for VII (a single metro area), and this puts about ten leading states in competition. The car companies have suggested a more virtual FOT to allow broader involvement and eliminate the winner-take-all mentality: they must sell cars in all states, not just one. This leads to idea of simulating data flows and the like behind VII, and Mitretek is looking into this. Road pricing was raised as one possible application that could address congestion.

6. The discussion of VII led to the question of how MITSC would change if VII was a reality. JS suggested real-time traffic management as the likely/desired difference.

7. JS raised the importance of performance measures related to safety and mobility. Is MITSC having an affect? Perhaps RUTS could help with the question of how the network performs from day to day.

8. JS reported that the auto companies are interested in reducing the problem of run-off-road crashes. To do this, good lane markings are needed, and these are expensive to maintain. Perhaps, high-resolution mapping and GPS could be combined to replace painted markings.

9. Bob asked JS if restricted-use algorithms that count cars and calculate percentages of commercial and other types of traffic would be useful. Jim suggested yes, and recommended that we examine traffic.com. This system costs about $30,000 per location, he reported.

10. JS reported GM is touting OnStar as sufficient for supporting desired VII applications. Currently, GM/OnStar is attempting to validate that OnStar can provide enough data to support traffic operations. He recommended including representatives from GM/OnStar in the focus groups and named Bonnie Reid as a first contact.

After the meeting, JS contacted us to raise two additional points. These are summarized below.

11. Within the latest reauthorization (SAFETEA LU), Michigan is the only state exempt from the three-year limit on using CMAQ funds for an operational project. As a result, MDOT quickly performed the CMAQ calculation, developed the application, amended the TIP, etc., and got some funding for MITSC switched back to CMAQ funding. Specifically, this switch covered three major programs:

- Courtesy Patrol – 3-year contract for $6,400,000
- MITS Control Room Operations – 3-year contract for $4,600,000
- MITS Maintenance Contract – 3-year contract for $3,230,000

So far, only the first year of the three-year contracts has been approved.

12. JS also raised the possibility that the restricted use study could provide a deal for better measurement of VMT. Such a measure could be an input for examining emissions and/or fuel consumption.

Summary of Interview with Tim Hoeffner

Note: This summary has yet to be approved by Tim Hoeffner.

MAIN TOPIC: Inter-modal and Multi-modal Applications

Using the template developed for discussions with key MDOT informants, Richard Wallace, Tim Doyle, and Bob Shuchman traveled to Lansing and met with Tim Hoeffner of MDOT (formerly of MDOT's Multi-modal Transportation Bureau and now in charge of Intermodal Policy within MDOT's Transportation Planning Bureau) to validate and confirm previous directions for the restricted use technology study in inter-modal and multi-modal transportation, as well as to better understand what MDOT is doing related to inter-modal and multi-modal issues and how restricted use technology might contribute to these efforts. Our discussion lasted about one hour.

1. Tim (TH) began by overviewing the modes that fall within the Multimodal Bureau's (MTB's) domain. These are: transit (bus mostly but also inner-city, including Amtrak and inner-city bus), freight (rail), air carriers, airports, marine/ports, and ferries (but few of those out there fall under MDOT). He also mentioned three modes, besides highways, that do NOT fall under the MTB's purview: pipelines, pleasure boating, and fiber under highways; the latter falls under MDOT's real estate group.

2. TH estimated the annual budget for MTB to be $500 million/year, with about $200 million for aviation programs, $200-250 million for all sorts of transit (including fixed-route, paratransit, specialized services, etc.—most passes through to providers, such as AATA), and much smaller amounts for the rest. MDOT provides one-third of the funding to the Port of Detroit, by statute. This applies only to the Port of Detroit and not other Michigan ports.

3. TH elaborated on several responsibilities that MTB has for rail transportation: (1) Safety and welfare on all railroads in the state, including a regulatory role dealing with grade crossings and safety devices at crossings and to ensure for health, safety, and welfare of railroad employees. Once every two years, they must inspect all of the approximately 6,000 public grade crossings in the state; for these, they examine pavement markings, stop markings, RR signs, gate arms, aiming of lights, etc. (note: this is not accomplished through the asset management surveys; rather, it is a separate data collection). (2) Ownership of about 700 miles of rail belonging to the state. For these, they are responsible for engineering, capital costs, train operations, etc. (3) Intersection of railroads and other modes. (4) Economic development. Some of the rail activity involves working with the Motor Carrier Division of the state police. Interestingly, MDOT does not inspect rail between crossings (used to, but they quit when the funding for this activity dried up).

4. TH also listed MTB's major roles in buses and transit. These include: providing advice and technical assistance, such as on bus purchases (they can aggregate purchases for small, rural agencies to obtain a better price); regulating inner-city buses and limousines (with fewer than 16 passengers); and operating some facilities, such as a joint Park-n-Ride/Greyhound station along I-696. MTB does not have a role in the purchase or operation of school buses. He also mentioned that MDOT has a special responsibility to work on security issues for the Detroit People Mover (DPM). He expressed some interest in detection systems for this purpose and mentioned Barbara Hansen, the Executive Director of the DPM, as a possible contact.

5. In regards to aviation programs, TH reported that MDOT owns three airports and provides funding (generally directed toward capital improvements) for many more. Michigan is home to about 200 airports.

6. In regards to marine transportation and freight, TH reported that MDOT has dealings with the Great Lakes carrier organization. MDOT's role here is not large. MDOT has very little to do with ferries across the great lakes (mostly a Coast Guard problem).

7. As for intermodal issues, TH focused on the Detroit Intermodal Freight Terminal (in southwest Detroit). MDOT is heavily involved here, as part of a group including auto companies, shipping companies, railroad industry, various municipalities, and the like. TH emphasized the NEPA process associated with such a terminal, and reported that ingress and egress for trucks was the driving factor in this process. He also reported that MDOT served as peer reviewer of SEMCOG's report on the intermodal freight terminal proposed by GM for Milan and rejected by area residents.

8. When asked about big programs on the horizon within Multimodal, he mentioned two earmarks coming from SAFETEA LU: (1) the $100 million for studying and pre-engineering for an Ann Arbor-Detroit fixed-guideway transit system, and (2) a similar, but smaller and more preliminary in focus grant to the Grand Rapids to study a fixed-guideway system for there. He also mentioned the large plaza expansion project starting at the Blue Water Bridges [also a focus of our discussion with Kris Wisniewski].

9. When asked about MTB's regulatory role, TH reported a few: close clearances in rail right of way (e.g., encroachment of vegetation limiting sight distances), licensing of limousines and airplanes, and tall structures (such as buildings and towers) in the vicinity of airports.

10. When asked for his wish list of inputs that could be obtained from this restricted use study, he focused on mapping and asset-management like applications. He mentioned, for example, that MTB had just completed a digital mapping project a railroads in the state and were now working on the same for non-motorized trails (such as biking trails). He also mentioned that they knew coordinates of intermodal facilities, and might benefit from high-resolution imagery of these facilities. He also thought that the study might help with studying utilization of some facilities, such as Park-n-Ride lots and rest-area truck parking areas by day, time, etc. He followed up that trucks often park along other facilities and this makes him wonder if that is because the rest-area spots are full; and what of the private truck stops?

11. When asked about others who should participate to represent multi-modal and inter-modal issues, he mentioned Rob Abent (Bureau Director) and Rob's four section leaders: Mel Williams (freight), Sharon Edgar (transit), Pauline Misjak (aviation), and Rick Hamilton (capital side of airports). He also mentioned John Taylor of Grand Valley State University as a university-based expert on freight logistics. [Prior this question, TH had mentioned Barbara Hanson (Detroit People Mover), but he did not raise her name again directly in response to the question about contacts.].

Summary of Interview with Rob Surber (of CGI within DIT)

MAIN TOPIC: GIS and mapping

Using the template developed for discussions with key MDOT informants, Richard Wallace, Tim Doyle, Colin Brooks, and Bob Shuchman traveled to Lansing and met with Rob Surber, Deputy Director of the Center for Geographic Information (CGI) within the state's Department of Information Technology (DIT), to validate and confirm previous directions for the restricted use technology study in respect to GIS and mapping applications, as well as to better understand what MDOT and CGI are doing related to GIS and mapping issues and how restricted use technology might contribute to these efforts. MDOT staff had encouraged us to speak with a representative of CGI in this process, either Eric Swanson or Rob. Our discussion lasted about 1.25 hours.

1. Rob (RS) began by explaining how CGI fits in with DIT and state government as a whole. Originally, CGI started with a very small and staff and few resources and was housed in the Department of Management and Budget. Currently, CGI is within DIT and reports to the Deputy Director for Agency Services. CGI, now with a staff of 50-55 people, receives no direct funding from the legislature and instead charges other departments and agencies for its services through a mix of time and materials and fixed price arrangements. DNR, MDOT, and DEQ are CGI's primary customers, but about a dozen departments support CGI for development and maintenance of the statewide framework. In Rob's view, CGI performs two main functions: (1) managing Michigan's geographic framework, and (2) developing geospatial information technology applications. Both of these functions are described in more detail below, as items 2 and 3.

2. RS described management of the state's geographic framework as CGI's primary role. In this role, CGI manages core spatial information (referencing, attributes, etc.) for the state. It also creates common standards. Users, such as MDOT, can then add their own attribute and business data. This framework, which he described as "a big strip of Velcro onto which everything sticks," includes the complete road and highway network in the state (note: CGI sits on the Asset Management Council), as well as other components. In this role, CGI manages the Michigan component of the national map for USGS. It also maintains the spatial data warehouse for the state and works on redistricting (viewed as apolitical technical experts). CGI aims for the ongoing use and application of geographic data.

3. RS explained that developing geospatial information technology applications is CGI's second major function. These applications are largely web applications (.NET, Java); for example, CGI hosts the state's recreational boating information system. They also manage the Transportation Asset Management System (TRAMS), which includes a complete linear referencing system used by MDOT, Michigan State Police, and others. All roads in the state (not just the trunk line) are included.

4. RS also talked some about the State Imagery Program. This is a partnership between the state and local units of government to get the best possible image data for the counties. CGI will get the data, too, and have distribution rights for somewhat degraded data sets. This includes the

current flyover effort underway by SEMCOG. He indicated that Anne Burns and Steve Perry are the best contacts at SEMCOG on this issue.

5. Asked to describe an example project done by CGI, RS mentioned one done for DNR. In this project, CGI is completing asset management mapping for DNR, including all roads in state parks. CGI also completed a railroad map, including crossings, for MDOT's Multimodal Transportation unit [same project was mentioned by Tim Hoeffner].

6. RS was asked to describe the spatial accuracies/resolutions of CGI's basemap. He explained that the road base map has about 7-meter horizontal positional accuracy or better and has been used to modernize TIGER for the Census Bureau. CGI would move to improved positional accuracies IF its clients wanted it (and were willing to pay for it). We briefly discussed a pilot study that would help move CGI to higher resolution, and RS expressed interest in that. In regards to the state digital elevation model (DEM), RS expressed some dissatisfaction with the current resolution of 30 meters for most of the state. He also mentioned that certain areas of the state (i.e. SEMCOG region) have created elevation data with better resolution, and Traverse City area has it now (about 10 m for there).

7. Asked to mention particularly vexing problems currently faced by CGI, he mentioned a few. First, he mentioned that CGI often gets stuck between data owners and users. Data owners are not always the users, and users often want or need things that the owners do not see value in and thus do not provide. He also mentioned that the Real Estate Bureau needs to digitally convert all hard-copy map products in a timely manner and begin managing land data in a GIS. Finally, he lamented that the Michigan land use/land cover mapping effort has fallen behind others in the area. In the 1970s, Michigan was a leader in this area, but not anymore. CGI is involved in the current effort by MSU to produce an updated statewide land cover map. He also mentioned that the NAIP (National Agricultural Imagery Program, part of the USDA Aerial Photography Field Office) project completed a flyover this past August, and this will create statewide 1-meter color orthophotos.

8. When asked how CGI could benefit from the restricted use study, RS mentioned two themes. First, CGI could benefit from a good, sustainable business plan for its activities across the state. Second, he wants to see this study build on CGI's existing knowledge and infrastructure. For example, attempts at remotely sensing poor pavement conditions should not lose the value of the already existing data on this topic. Finally, he mentioned that CGI can be an important driver for the use of geospatial technology throughout the state.

9. When asked to identify additional people who should participate in the stakeholder focus groups, he mentioned Doug Couto of DIT (MDOT's primary link to DIT) and Susan Fries of the Michigan State Police, as well as his boss, Eric Swanson. He also emphasized the importance of including representatives from DEQ and HAL, but did not mention names. He expressed the opinion that Paul McAllister of MDOT would identify the best people from these agencies.

Summary of Interview with John Friend and Jim Culp

MAIN TOPIC: Traffic safety and congestion

Using the template developed for discussions with key MDOT informants, Richard Wallace, Greg Leonard, and Bob Shuchman traveled to Lansing and met with John Friend (Bureau Director, Highway Delivery) and Jim Culp (head of the Traffic & Safety Support Area) of MDOT to validate and confirm previous directions for the restricted use technology study in respect to traffic congestion and safety applications, as well as to better understand what MDOT is doing related to traffic congestion and safety and how restricted use technology might contribute to these efforts. Our discussion lasted about 1.25 hours, but Jim had to leave for another meeting after about 45-50 minutes.

1. After a brief update on the project presented by Richard, John Friend (JF) gave an overview of MDOT's mission in regards to traffic congestion. As John presented it, MDOT wants to operate the system more efficiently. In short, the goal with respect to congestion is to optimize system performance. Ideally, MDOT operators would know when and where congestion is and where to divert some of the congested traffic to alleviate the congestion (put simply, to move vehicle traffic from congested to non-congested roads), regardless of whose jurisdiction the roads are under. Thus, this raises some jurisdictional issues and the need for regional cooperation. In JF's view, Michigan is not a leader in this area currently, and he sees Florida DOT and Caltrans as the leaders in such optimization.

2. JF expressed the view that a combination of factors is needed to achieve the desired efficiency/optimization of the system. He named three specifically: (1) ITS for detection, real-time information, etc.; (2) marketing of the value of such optimization (to the legislature, the public, and local elected and road officials); and (3) jurisdictional issues, especially moving away from concern about whose road it is. He further explained that the SE Michigan area has a $250K grant to examine regional operations. The focus needs to be on corridors, not jurisdiction.

3. Asked if he knew of any good models that can predict congestion based on historical data, time and day, weather, etc., he indicated that such models do not really exist (yet). Planning does a fair bit of modeling, but not with accuracy needed to support the operations vision described above.

4. After JF's overview of congestion and operations concerns, Jim Culp (JC) indicated that he needed to know more about the restricted data before he could provide a similar overview of traffic safety issues; for example, he asked, are the data continuous? Thus, Bob briefly summarized three types of technology that might be used: (1) satellites providing periodic snapshots, (2) unmanned aerial vehicles (UAVs) providing continuous coverage for some period of time (perhaps as eight hours at a stretch), and (3) algorithms, such as one that could integrate and analyze data from a variety of video inputs. Such an approach, according to Bob, aided in the capture of the London subway bombers of this past summer.

5. Following Bob's overview of restricted technologies, JC mentioned that MDOT, in cooperation with several other state agencies (Michigan State Police, for example), had recently prepared a strategic plan for traffic safety focused on twelve most promising areas for improvement. Thus, this report details priorities in the traffic safety area. He offered to share the report with us and sent it to us electronically the next day. He suggested that the restricted use study might be helpful with accident reconstruction, examination of traffic patterns through intersections and corridors of interest, and evaluation of signal retiming efforts. The latter was added in response to a direct question from Richard, and JC went on to explain that signal retiming will be a major investment for MDOT (and other units of government) over the next few years. The Metro Detroit area will be the start (Oakland County largely done and Macomb underway).

6. Both JF and JC agreed that border congestion is not really an issue for their groups, either for the congestion or traffic safety groups.

7. When asked to comment on the resource spent on traffic congestion and safety, JF emphasized that, regardless of the amount, the dollars just are not there for operations. In his view, MDOT is at a crossroads. Historically, and he entered MDOT as this era was winding down, MDOT was oriented toward design, construction, and maintenance of roads and highways. It went through a long phase of building the interstates and then a phase of focusing on rebuilding, reconstructing, and repairing them. Now, however, MDOT needs to move to an operational focus, and what has served the department well in the past will not serve it well in the future. In his opinion, all of MDOT's top leadership shared this perspective, but that it is difficult to convince the legislature, local officials, etc. Thus, in his view, MDOT needs to show the public the benefits of operations.

8. Both JF and JC agreed that crashes in the lead up to work zones are a major problem for MDOT at this time. Lately, the number of these crashes, often involving trucks, is on the rise and some have been high profile (in the news). The largest component of work-zone-related crashes occurs prior to the actual work zone itself, during the merge process. Thus, they expressed a need for early notification of the zone's existence to trucks, especially. They also explained some of the difficulties in doing this, such as the changing length of the entering queue, making signage more difficult to manage and premature alarms being viewed as false alarms (until it is too late). JC also stated that 90% of the fatalities in work-zone crashes are motorists and their passengers, but the regulatory mandate for the department was to focus on work-zone workers. We also discussed the interaction between safety and congestion on this issue (crashes lead to shutdown, worsening congestion that already tends to be problematic near work zones). They also mentioned that, for intersection crashes, elderly drivers are over-represented due to their problems judging distances and closing speeds.

9. JF stated that the biggest benefit for congestion reduction would be furthering integrated operations (perhaps including a multimodal element) that figures out how congestion occurs and where it is at and indicates where to move the traffic.

10. Asked to name possible stakeholder focus group participants from their areas, they mentioned Paula Corlett and Mike Scheur, both of whom are working on signal retiming, and

Brian Zimmerman of MDOT's Construction and Technology Support area, who is involved in work-zone issues.

APPENDIX C: Example of Altarum Consultant Agreement

CONSULTING SERVICES AGREEMENT
ALTARUM INSTITUTE

Agreement No._____

This Agreement, effective as of the ____ day of _____ 200X, is by and between the Altarum Institute, a Michigan nonprofit corporation with principal offices at 3520 Green Court, Suite 300, Ann Arbor, Michigan 48105 ("Altarum"), and _____ ("Consultant"), whose business address is _____. This Agreement does not constitute authorization to begin work, nor establish the statement of work to be performed, both of which will be contractually set by issuance of specific purchase orders. This Agreement establishes between the Consultant and Altarum that the Consultant, upon receipt of an Altarum purchase order, shall furnish certain consulting services, subject to the following terms and conditions:

1. CHARACTER AND EXTENT OF SERVICE

1.1 Consultant shall use its best efforts in furnishing consulting services to Altarum, as described in individual purchase orders to be issued hereunder, in the following field: _____.

The precise character and scope of Consultant's services shall be determined by the Altarum Project Manager, _____, and/or a representative duly authorized by the Project Manager. Altarum may change the Project Manager by written notice to Consultant at any time.

2. RELATIONSHIP OF THE PARTIES

2.1 Consultant's relationship to Altarum is that of independent contractor and nothing in this Agreement shall be construed as creating a relationship of joint venture, partnership, employer-employee, or agent. Further, Consultant shall not be treated as an employee for purposes of the Federal Insurance Contributions Act, the Social Security Act, the Federal Unemployment Act, income tax withholding and applicable states laws, including without limitation, those pertaining to workers' compensation, unemployment compensation and state income tax withholding.

2.2 Nothing in this Agreement shall be construed to grant Consultant the right to make commitments of any kind for or on behalf of Altarum without the prior written consent of Altarum.

2.3 Consultant shall file all tax returns and reports required to be filed pursuant to law, including, without limitation, reports required to be filed by former employees of the United States Government, if applicable.

2.4 Consultant agrees to obtain and maintain in force adequate Workers' Compensation insurance and appropriate liability insurance as is consistent with State law and responsible

business practices; certificates of insurance may be requested by Altarum and, if requested, shall be furnished in a timely manner. All insurance required by this Agreement is to be in effect prior to commencement of effort and/or services by Consultant under this Agreement.

2.5 Consultant hereby agrees to indemnify and hold harmless Altarum from and against any and all damages, expenses, liabilities and claims arising from any sickness, injuries to, or death of Consultant or any of Consultant's personnel while present in or about Altarum's plant or premises.

2.6 Consultant, as an independent contractor, is not eligible to receive any benefits available to Altarum employees, including without limitation health insurance, dental/optical insurance, holiday and vacation pay, and plans relating to the purchase or award of stock or stock options.

2.7 Consultant has absolute discretion as to its working methods, hours, and means of operation in connection with performing its work hereunder. Additionally, Consultant remains free to provide services for entities and organizations other than Altarum during the term hereof, so long as such work does not impair Consultant's ability to fulfill its commitments to Altarum and does not violate any term or condition of this Agreement.

3. PERIOD OF SERVICE AND TERMINATION

3.1 Services to be performed hereunder shall be rendered during the period from _____.

3.2 Altarum may terminate this Agreement or cancel any corresponding purchase order immediately for the following reasons, by giving the Consultant notice of such action as provided in Section 12.4 of this Agreement:

3.2.1 The project/matter to which the Consultant is providing services is eliminated and/or completed.

3.2.2 Consultant is unable to adequately perform the services required by the project/matter as designated in a corresponding purchase order.

3.2.3 Violation by the Consultant of any of the provisions of Section 10 hereof.

3.2.4 Consultant advises Altarum that a conflict may be created by his/her performance of services hereunder (as described in Section 11.6).

3.3 Either party may terminate this Agreement and cancel any corresponding purchase order for breach of any other provision contained herein if, after five (5) days notice of the breach, the breaching party fails to cure the breach.

3.4 The termination of this Agreement shall not affect the obligations of the Consultant as set forth in Section 10 hereof.

3.5 If termination is for breach of this Agreement, then, in addition to any other remedies that may be provided for in this Agreement, the parties shall have such other remedies as are provided in law or equity.

4. COMPENSATION

4.1 Altarum will pay fees to Consultant for services performed hereunder at the rate of _____ per hour.

4.2 Altarum will reimburse Consultant for reasonable expenses actually incurred provided that the Project Manager has approved such expenses in advance of their being incurred. Travel reimbursement under this Agreement shall include actual costs for the Consultant's own air, rail and ground transportation, strictly limited to economy coach accommodations. Original receipts must be submitted with the invoice for travel expense reimbursement. Except as provided above, provisions of the applicable Federal Travel Regulations shall apply to entitlement for reimbursement.

4.3 All funding for services (including expenses) performed hereunder shall be provided by specific Altarum purchase order. To the extent that any of the terms and conditions set forth on the face of any such purchase order are inconsistent with the provisions contained in this Agreement, this Agreement shall govern. Notwithstanding the provisions of Paragraphs 4.1 and 4.2 above, Altarum will not be obligated to pay Consultant any amount beyond the amount authorized by a purchase order. Altarum shall not be obligated to pay Consultant for work performed by Consultant on a specific task prior to the issuance of a purchase order covering that task.

4.4 Payment of fees will be made within 45 days of receipt by Altarum of an invoice therefor from Consultant referencing the authorizing purchase order number, services rendered, and appropriate charges. Invoices for payment of fees and expenses shall be submitted by Consultant to Altarum on a monthly basis. The invoice must be supported by documentation of the work performed, such as a copy of an interim report, description of the services performed, or other material satisfactory to Altarum's Project Manager as designated in the purchase order for the work being billed, and must contain the following statement:

"I hereby certify that no lobbying activity has been performed for the Altarum Institute pursuant to this claim for payment."

5. ASSIGNMENT

This Agreement is personal and the Consultant may not assign, transfer or subcontract this Agreement, any work to be done under a purchase order, or any interest therein or claim thereunder without the prior written approval of Altarum.

6. REPORTING

Consultant shall report the results of his/her work, progress, work-product and related matters in a form and at such times as are acceptable to Altarum's Project Manager for that task as designated on the purchase order for the task.

7. INTELLECTUAL PROPERTY

7.1 **Patents.** Consultant shall, during and subsequent to the term of this Agreement, communicate promptly in writing to Altarum all inventions, designs, improvements and discoveries conceived or first actually reduced to practice under this Agreement and relating to the subject matter thereof, whether conceived by Consultant alone or with others and whether or not conceived during regular working hours. Consultant hereby irrevocably assigns to Altarum, without further consideration or compensation, all worldwide right, title and interest in such inventions, designs, improvements, discoveries and grants to Altarum full and exclusive worldwide title to all patents. Consultant further agrees to assist Altarum in every proper way to obtain for Altarum's benefit worldwide patents in inventions, designs, improvements, or discoveries. All inventions, designs, improvements or discoveries hereunder shall be and remain the property of Altarum whether or not patented.

7.2 **Copyrights, Trademarks**

7.2.1 **Assignment.** Consultant hereby agrees that, to the extent permitted by law, all copyrightable works including, but not limited to, software and other written materials created by it under this Agreement shall be considered "works made for hire" and all copyright ownership shall reside in Altarum. Consultant further agrees that to the extent any copyrightable work created by it under this Agreement is not a "work made for hire," Consultant hereby irrevocably assigns to Altarum without further consideration or compensation all worldwide right, title and interest to copyrightable work created by Consultant and its agents and the worldwide copyrights thereto and all the related rights, for their entire terms, free and clear of all encumbrances, and regardless of whether they may be "works made for hire" under the United States Copyright Revision Act of 1976, as amended. Consultant shall also provide Altarum, at Altarum's expense, all proper assistance to secure for Altarum and maintain for Altarum's benefit all trademarks and trade names and registrations thereof, copyrights and registrations, extensions, and renewals thereof on all such material, including any translations. All material produced under this Agreement shall be and remain the property of Altarum whether or not registered. All data, copyrights and copyrightable creations, and reports developed in the performance of this Agreement shall be the sole property of Altarum and shall be used by the Consultant solely in work for Altarum. Upon termination or expiration of this Agreement, Consultant shall deliver all such records, data, information, models, tools and other documents – and all copies thereof – to Altarum.

7.2.2 **Warranties.** Consultant represents and warrants that any materials (including software) created by Consultant and its agents are original works or writings and have not been copied in whole or in part from the copyrighted work or writing of another person without that

person's written consent and, further, that Consultant represents and warrants to Altarum that such materials do not infringe any intellectual property right of another person.

7.2.3 **Indemnification.** Consultant will indemnify and hold Altarum, its directors, officers, employees and agents harmless from any claim, demand, loss, damage, or judgment, including without limitation, attorneys' fees arising out of any breach of any warranty hereunder or any other breach of this Agreement and any claim to the rights in the intellectual property and related written materials and will, among other things, defend at its sole cost any and all actions arising out of any such breach or claim.

8. TECHNICAL INFORMATION, RECORDS, AND REPORTS

All notes, designs, drawings, memoranda, reports, and other technical data, if any, furnished by the Consultant pursuant to the provisions of this Agreement or developed by the Consultant in connection with the performance of services hereunder shall belong to Altarum. All such notes, designs, drawings, memoranda, reports, and other technical data shall be delivered to Altarum upon demand, and Altarum shall have the right to use them, or any portion of them, for any purpose which it may deem desirable, without the necessity of compensating the Consultant, or any other persons, for the use thereof.

9. EXAMINATION OF RECORDS

Altarum shall have access to and the right to examine all documents, papers, and records of Consultant concerning transactions relating to this Agreement. Notwithstanding the preceding provision, Consultant acknowledges and agrees that it does not have authority to bind or create obligations for Altarum.

10. PROPRIETARY INFORMATION

10.1 In order to assist Consultant in the performance of this Agreement, Altarum may provide Consultant with proprietary information including, but not limited to, trade secrets, trademarks, tradenames, drawings, formulas, patterns, masks, models, devices, computer software, secret inventions, processes, and compilations of information, records and specifications which are owned or licensed by Altarum (hereafter "Proprietary Information").

10.2 Consultant shall use at least the same degree of care to protect and prevent unauthorized use, duplication and disclosure of any Proprietary Information as it would use to protect and prevent unauthorized use, duplication and disclosure of its own proprietary information unless such information (a) was known to Consultant prior to receipt of the information directly or indirectly from Altarum; or (b) is now or becomes known to Consultant through no act or failure to act on the part of Consultant or of any person under any obligation of confidentiality to Altarum; or (c) is now or becomes generally known or available to the public. Consultant shall use Proprietary Information only in the performance of this Agreement. No other use, duplication or disclosure of Proprietary Information, whether for Consultant's benefit or for the benefit of others, shall be permitted.

10.3 In no event is Consultant authorized to duplicate or disclose Proprietary Information without the prior written approval of Altarum or to use Proprietary Information except for the performance of this Agreement. Upon expiration or termination of this Agreement, Consultant shall cease all use of Altarum's Proprietary Information and return all tangible copies of such Proprietary Information to Altarum. This clause shall be binding from the effective date of this Agreement until five years after termination of this Agreement.

11. STANDARDS OF CONDUCT

11.1 Consultant will not hire any employee of Altarum to perform any service covered by this Agreement.

11.2 The Consultant, including its officers, employees and agents, directly engaged in performing work or conducting business required by this Agreement shall adhere to the policies set forth in Exhibit A, which may be amended from time to time, and if the Consultant is performing work or conducting business required by this Agreement at Altarum's or a customer's facility, Consultant shall adhere to the policies and procedures set forth at the particular facility. In the event of a conflict between Exhibit A and a facility's policies and procedures, the facility's policies and procedures shall prevail. If a Consultant, including its officers, employees and agents, is/are found by Altarum to be in violation of this provision, Altarum may, at its option, unilaterally: (1) require Consultant to remove itself or its officer(s), employee(s) and/or agent(s) from performing any further work under this Agreement or a corresponding purchase order, or (2) immediately terminate this Agreement or a corresponding purchase order in whole or in part.

11.3 Consultant affirms that to the best of his/her knowledge there exists no actual or potential conflict between Consultant's family, business, or financial interests and his/her services during this Agreement, and in the event of change in either his/her private interests or service under this Agreement, he/she will raise with Altarum any questions regarding possible conflict of interest which may arise as a result of such change.

11.4 Consultant affirms that he/she is not being compensated as a lobbyist for Altarum pursuant to this Agreement.

11.5 The pertinent books and records of Consultant shall at all reasonable times be available for inspection, audit, and/or reproduction by an authorized representative of Altarum or the United States Government (including, without limitation, a U.S. Government procurement agency, the U.S. Comptroller General, or any of their designated agents). Such records shall remain available for inspection, audit and/or reproduction for a period of three years following receipt by the Consultant of final payment under this Agreement by Altarum.

11.6 Consultant warrants to Altarum that his/her performance of services under this Agreement will not create a conflict of interest with any employer, client or other third party for whom Consultant is performing services. Consultant agrees that he/she will advise Altarum in the event that such a conflict may be created by his/her performance of services hereunder.

Consultant hereby agrees to indemnify and hold Altarum and its subsidiaries and affiliated corporations and its/their officers and employees harmless from and against any claims, actions, causes of action, costs, damages, expenses or liabilities which are or may be incurred as a result of any violations or failures to comply by Consultant or its employees, agents or representatives with any or all of the provisions of this Agreement.

12. MISCELLANEOUS

This Agreement shall be governed by the laws of the State of Michigan without regard to its conflicts of law provisions.

This Agreement contains the full and complete understanding of the parties hereto in connection with the subject matter contained herein, and supercedes all prior understandings and writings, written or oral, relating to the same subject. No waiver or amendment of any provision contained herein shall be binding unless in writing and signed by the parties.

The waiver by either party of a breach by the other party of any provision of this Agreement shall not be construed as a waiver of any succeeding breach of the same or any other provision, nor shall any delay or omission on the part of either party to exercise any right that it has operate as a waiver of any right by that party.

12.4 All notices shall be in writing and be deemed to be given or made when delivered by (a) hand, (b) facsimile, provided sender has verification of successful transmission, with a mailed copy of same to the addressee, (c) express mail, provided it has the ability to track delivery, or (d) certified or registered mail, return receipt requested, to the party at the address set forth below or at such other address as may be provided in writing by said party for the receipt of notices:

If to Consultant:	If to Altarum:
_____	XXXXXXXX
_____	Altarum Institute
_____	3520 Green Court, Suite 300
_____	Ann Arbor, MI 48105
Fax: _____	Fax: (734) 302-XXXX

[Signatures on Following Page]

IN WITNESS WHEREOF, the parties by their duly authorized representatives have caused this Agreement to be executed as of the date first written above.

ALTARUM INSTITUTE

BY _____
NAME _____
TITLE _____

CONSULTANT

BY _____
NAME _____
TITLE _____
SSN/EIN _____
CITIZENSHIP _____
ADDRESS _____

EXHIBIT A

Honesty, Discretion and Common Sense

Altarum operates on the principles of honesty, integrity, and personal responsibility. Altarum expects that individuals will follow the highest ethical standards at all times. Therefore, individuals must exercise good judgment, intelligence, professional discretion, and common sense at all times.

Alcohol and Drugs

Altarum does not tolerate the use of alcohol or other substances that impair an individual's judgment or ability to perform. Furthermore, it is Altarum's policy to maintain a drug-free workplace. The unlawful manufacture, distribution, dispensing, possession or use of "controlled substances" in the workplace is prohibited. "Controlled substances" include, but are not limited to, street drugs such as marijuana, cocaine, opiates, amphetamines and PCP, as well as prescription drugs that were not prescribed for the individual. The "workplace" is a site where work is done in connection with a covered federal grant or contract including, but not limited to, Altarum premises and Altarum vehicles.

Compliance with Applicable Laws

All business must be conducted in strict compliance with all laws and regulations applicable to Altarum's activities. No person should at any time authorize or take any action on behalf of Altarum which he or she knows or reasonably should know to be in violation of any applicable law or regulation.

Harassment

All persons must avoid any action which might be regarded as sexual harassment or abusive conduct by making unwelcome sexual advances or requests for sexual favors from another, by engaging in verbal or physical conduct of a sexual or abusive nature which has the purpose or effect of interfering with another's work performance or creating an intimidating, hostile or offensive work environment.

Smoking

Altarum has a smoke-free work environment. There is no smoking allowed in any of the Altarum facilities. Facility-specific rules pertaining to designated smoking areas are to be followed at all times.

APPENDIX D: Sample Invitation for Michigan-State-Government Invitees

September 21, 2007

John MI-Govt Employee
3465 John Doe Lane
Lansing, MI 48917

Dear Colleagues:

The Michigan Department of Transportation (MDOT) and Altarum Institute are initiating a study of national importance to examine applications of restricted use technology to the management and operations of transportation systems. As part of this study, we invite you to attend the MDOT Restricted Use Technology Study Focus Group Launch Meeting to be held on **date, time, and place**. This will be a day and half meeting. Your participation will provide important contributions to our focus group process. The meetings will continue periodically over the following seven months.

The MDOT-Altarum Restricted Use Technology Study is an 18-month effort to explore how satellite and other remote sensing data can address the needs of MDOT. This study will combine data from fine detail, high-resolution remote sensing systems and other assets with advanced geospatial analysis techniques to examine transportation system concerns. This study will use data provided by civil agencies, commercial firms, and the Department of Defense, as appropriate to meet the study's goals and objectives.

Some of these transportation system activities and concerns include: asset management (aerial monitoring of environment and roadways); HAZMAT vehicles (safe operations and routing optimization); intelligent transportation systems and vehicle infrastructure integration (validation, calibration and extrapolation); border crossing operations (analyze international queues); traffic safety and congestion forecasting; high-resolution land cover mapping; and environmental assessment of transportation corridors.

The focus groups will bring together relevant experts in fields of transportation and remote sensing to understand the transportation issue concerns and how to utilize existing remotely sensed data and attendant technologies to address those concerns. The end goal of the focus groups is to define a set of potential pilot studies to test and demonstrate the added value of these national assets to MDOT's operations.

On behalf of MDOT, Altarum Institute is administering and coordinating the focus group meetings. Please notify Lisa Phillips by **Date**, 2005, at (734) 302-5608, or by email at lisa.phillips@altarum.org, as to whether you will or will not be able to attend. If you have any questions regarding the MDOT Restricted Use Technology Study, please feel free to contact Bill Tansil, Administrator, Asset Management Division, at (517) 373-2250.

We look forward to meeting with you on **date/time/place**.

Sincerely,

Bill Tansil, Administrator, Asset Management Division

APPENDIX E: Sample Invitation for Non-Michigan-Government Invitees

September 21, 2007

Jane Doe Non-MI-Govt Employee
3465 Jane Doe Lane
Lansing, MI 48917

Dear Jane:

The Michigan Department of Transportation (MDOT) and Altarum Institute are initiating a study of national importance to examine applications of restricted use technology to the management and operations of transportation systems. As part of this study, we invite you to attend the MDOT Restricted Use Technology Study Focus Group Launch Meeting to be held on **date, time, and place**. This will be a day and half meeting. Your participation will provide important contributions to our focus group process. The meetings will continue periodically over the following seven months. You will be remunerated for your participation.

The MDOT-Altarum Restricted Use Technology Study is an 18-month effort to explore how satellite and other remote sensing data can address the needs of MDOT. This study will combine data from fine detail, high-resolution remote sensing systems and other assets with advanced geospatial analysis techniques to examine transportation system concerns. This study will use data provided by civil agencies, commercial firms, and the Department of Defense, as appropriate to meet the study's goals and objectives.

Some of these transportation system activities and concerns include: asset management (aerial monitoring of environment and roadways); HAZMAT vehicles (safe operations and routing optimization); intelligent transportation systems and vehicle infrastructure integration (validation, calibration and extrapolation); border crossing operations (analyze international queues); traffic safety and congestion forecasting; high-resolution land cover mapping; and environmental assessment of transportation corridors.

The focus groups will bring together relevant experts in fields of transportation and remote sensing to understand the transportation issue concerns and how to utilize existing remotely sensed data and attendant technologies to address those concerns. The end goal of the focus groups is to define a set of potential pilot studies to test and demonstrate the added value of these national assets to MDOT's operations.

On behalf of MDOT, Altarum Institute is administering and coordinating the focus group meetings. Please notify Lisa Phillips by **Date**, 2005, at (734) 302-5608, or by email at lisa.phillips@altarum.org, as to whether you will or will not be able to attend. If you have any questions regarding the MDOT Restricted Use Technology Study, please feel free to contact Bill Tansil, Administrator, Asset Management Division, at (517) 373-2250.

We look forward to meeting with you on **date/time/place**.

Sincerely,

Greg Leonard, Project Manager, Altarum